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Improved Treadle Motion.

It is well known that the ordinary treadle is capable of transmitting the power imparted by the foot in one direction only, and that is on the downward thrust. The return of the treadle and continuance of the movement being effected by the momentum of the fly-wheel.

In these engravings a combination is represented which is an effectual remedy for this objection, and renders the treadle a much better agent for imparting the power applied to it. We shall refer to Fig. 2 first, since that shows the motion isolated or by itself. revolved. When the face-plate cranks, D, pass the center, the frame, A, with its weight and that of the fly-wheel, falls and carries the treadle up. In plain words, this treadle motion has the advantage of the weight of the fly-wheel and part of the frame, A, exerted at a time when the common treadle has no force but that of the momentum of the fly-wheel. In the engravings it is shown applied to circular and scroll saws, and also a boring head. This last is so arranged with a collar, H, on the sliding spindle that the auger can be set to bore a hole of any depth by simply moving the lever, I, in and out. In the com-

Fig. 1

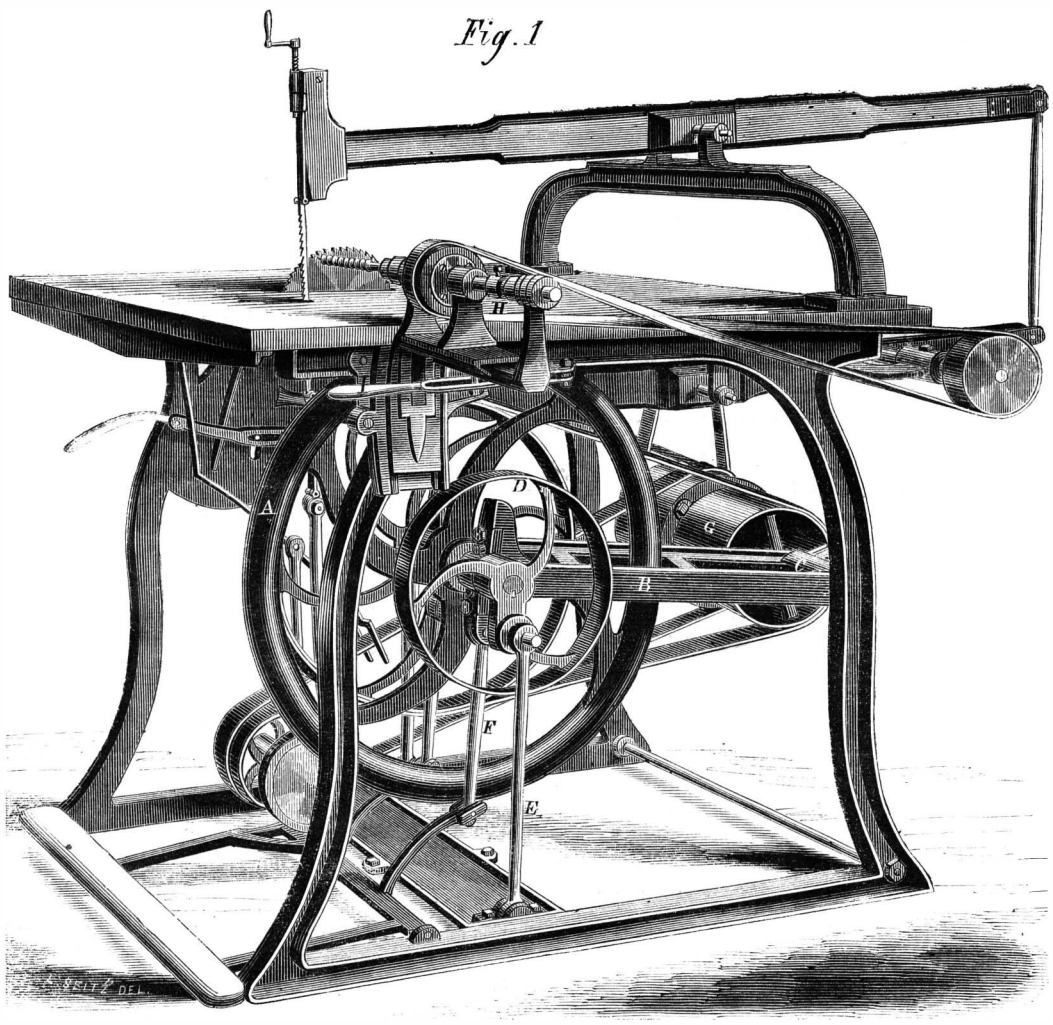
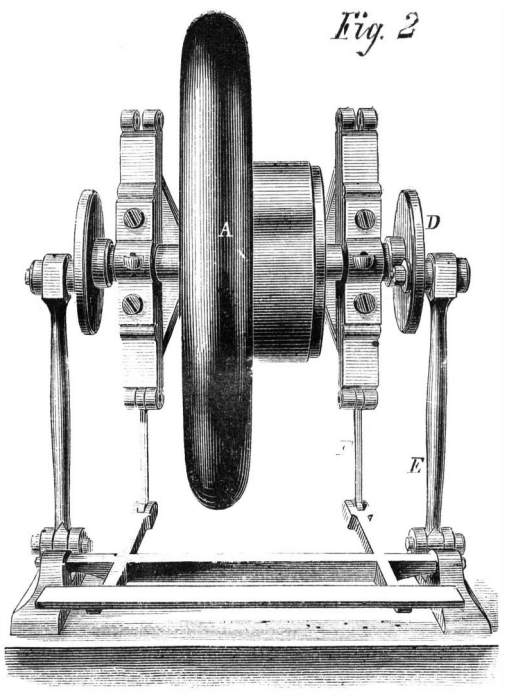


Fig. 2



KAEFER'S TREADLE MOTION.

In the perspective view (Fig. 1) so many pulley arms, and other parts not belonging to the motion, intervene, that the arrangement looks complicated, whereas it is extremely simple. The fly-wheel, A, is merely set in a frame, B, which vibrates on a shaft, C (Fig. 1). On each end of the fly-wheel shaft there is a face-plate, D, having rods, E, attached. The lower ends of these rods are secured to the floor. The treadle arms, F, are attached to the swinging frame, A, and it is easy to see that as the frame is lifted by pushing down with the foot, the stationary rods, E, on the face-plates, turn the fly-wheel and also the pulleys connected to it. From these pulleys belts run to a counter-shaft and pulleys, G (Fig. 1), at the back part of the machine. This is the whole arrangement, and it is simple and effective.

The point gained is this:—When the greatest force is exerted by the workman (that is, in pushing down with his foot), the frame is raised and the fly-wheel pass of the machine here shown (some six feet square) there are many conveniences for doing work ordinarily done by hand at a great expense of time and labor. Mechanics in country towns, or in places remote from power, will find this machine a great improvement on the old treadle, and those interested should examine into its merits. It was patented on the 6th of March, 1861, through the Scientific American Patent Agency, by M. Kaefer, of New York city. For further information address him at room No. 3, over the Harlem railroad freight depot, corner of Center and White streets.

The New Tax Bill and its Provisions.

Our readers are doubtless aware that the taxation on manufactured articles and materials has been increased, but has not yet become a law. We subjoin that portion which relates to metals, etc.:—

"The bill increases all the rates on iron equal, as near as may be, to the internal duties, and so as to steel, which is a fraction over. On some manufactures of iron, including the smaller sizes, the duties have been slightly increased; on files, saws, and a few other articles, a compound duty partly specific and partly ad valorem; on screws, commonly called wood screws, 2 inches or over in length, 6½ cents per pound; less than 2 inches in length, 9½ cents per pound; on screws of any other material than iron, and all other screws of iron except wood screws, 35 per cent ad valorem.

"On iron in pigs $9 per tun; on vessels of cast-iron not otherwise provided for, and on imitations of said iron, $1; and potter's iron, stoves and stove plates of cast-iron, 11½ cents per pound; on cast-iron steam, gas, and water pipes, 11½ cents per pound; on cast-iron butts and hinges, 2½ cents per pound; on all castings of iron not otherwise provided for, 35 per cent ad valorem; on old scrap iron $9 per tun.

"On steel in any form, not otherwise provided for, 30 per cent ad valorem; on cross-cut saws, 10 cents per lineal foot; on mill, pit, and drag saws, not over nine inches, 15½ cents per lineal foot; on all manufactures of steel, or of which steel shall be a component part, not otherwise provided for, 35 per cent ad valorem—provided that all articles partially manufactured of steel or of which steel shall be a component part, not otherwise provided for, shall pay the same rate of duty as if wholly manufactured.

"On lead in pigs and bars, 2 cents per pound; on old scrap lead, fit only to be re-manufactured, 2 cents per pound; lead in sheets, pipe or shot, 2¾ cents per pound; pewter when old and fit only to be re-manufactured, 2 cents per pound; lead ore, 1½ cents per pound.

"Copper in pigs, bars, or ingots, 2¼ cents per pound; copper, old and fit only to be re-manufactured, 2 cents per pound; sheating copper in sheets 48 inches long and 14 inches wide, weighing from 14 to 15 ounces per square foot, 3½ cents per pound; copper rods, bolts, nails, spikes, copper blocks, copper in sheet or plate called brazer copper, and other sheets of copper not otherwise provided for, 25 per cent ad valorem.

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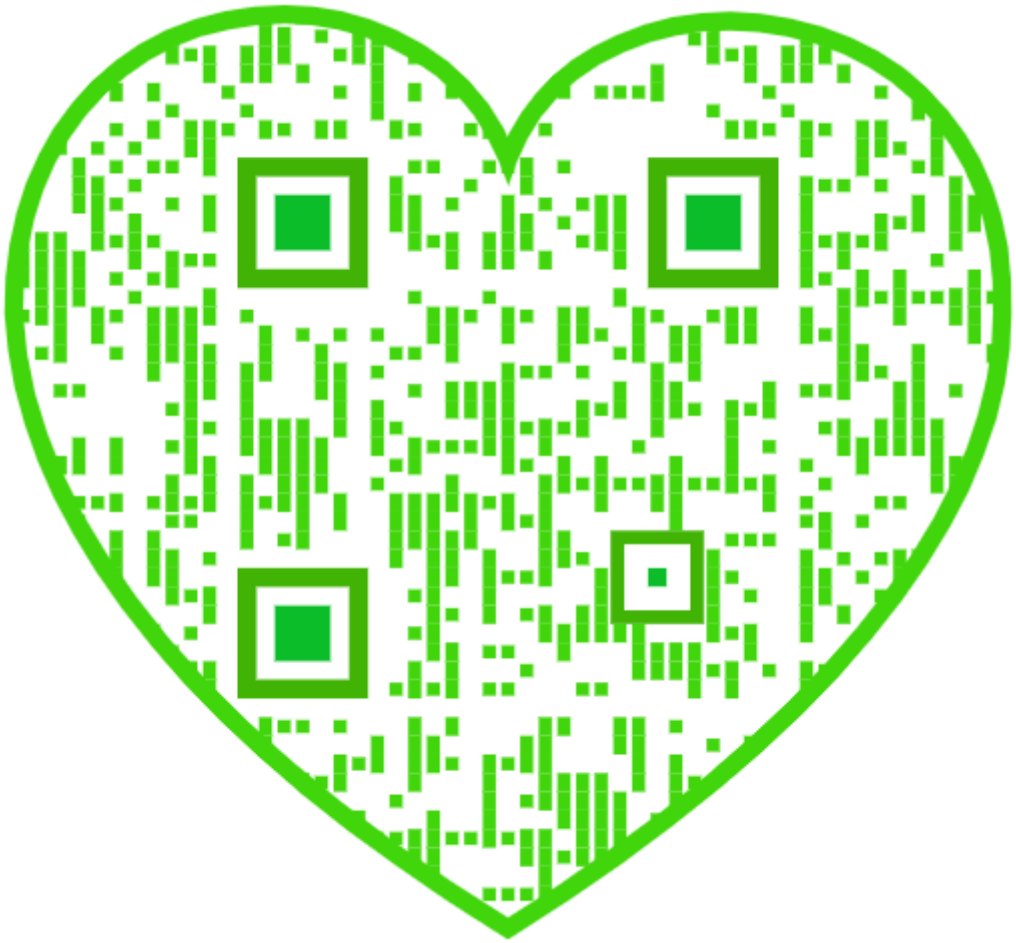

"On zinc, spelter, or tin, manufactured in blocks or pigs, 1½ cent per pound; zinc, spelter, or tin sheets, 2¼ cents per pound.

The Cause of the Boiler Explosion at Merrick & Sons.

The unusually intelligent coroner's jury in this case, of which Coleman Sellers was foreman, have rendered a verdict clearly pointing out a fault in the construction of the boiler as the cause of the explosion. It seems also that the order had been given to discontinue the use of the defective boiler, and this order was in course of execution at the time the explosion occurred. We extract the portion of the verdict which explains the faulty construction:—

"The bottom or furnace part of the boiler consists of a series of arched passages used as furnaces; said passages being twenty-one inches wide, semicircular on the top or crown, and stayed from one to the other by a series of iron braces. The parts between the arches are what have been termed water-legs. These water-legs on the old boiler extended from the front to the back of the boiler, thus forming powerful beams, thirty inches in depth, to resist the pressure of the steam tending to push the bottom out of the boiler. At the front they are connected by a water-space below the doors of the furnaces, and at the back by a water-space extending to the bottom; and thus were firmly united and formed, as it were, a floor supported by beams about thirty inches deep, five inches wide, and only thirteen feet long, which were, moreover, tied together, top and bottom, at both ends to prevent their spreading at the bottom from the pressure above; a form admirably adapted to carry the load placed upon it.

"In the new boiler we find that the beams upon which depend the stability of the bottom were not continued from end to end of a uniform depth, but by the cutting-off of the part which was filled with sediment in the old boiler, have been reduced to a depth, from the crown to the bottom, of but thirteen inches for a distance of one-half of their entire length. Hence the floor-beams, as it were, are reduced to less than one-half the depth of those in the old boiler, namely, from thirty inches to thirteen inches in the center of the boiler bottom. The most valuable part of the beams having been removed by this operation, and the main support of the crown sheets taken away, no additional stays were put in to compensate for this weakness.

"Without going into any calculation of the strength of the floor of the boiler, we see that it is not half as strong as the old one, and has yielded under a pressure of only fifty-seven pounds per square inch. That the yield took place at this part, in the very center of the boiler bottom, is manifested by the leak, which persistently appeared at this very part, where a rupture should have begun if the floor was too weak. This leak was mended from time to time, but, on the day of the explosion, had increased to such an extent as to endanger the water-supply, and to cause the order to be given for discontinuing the use of this boiler, unfortunately too late, although this order was promptly given, and was in course of execution."

Kinds of Cotton and the Yield.

The sceptre of King Cotton is wrested from him! The royal prerogative was sacrificed through the reckless passion and insane folly of his friends. Yet it is right: he never was entitled to the distinction. First useful, then influential, then powerful, he became inflated with insufferable vanity, and odious with intolerable arrogance. Profiting by the lesson, reduced to his natural position, he may again become useful, perhaps travel north a little, and act in a circle less circumscribed by prejudice and that "vaulting ambition" that so often overleaps itself.

The plant producing the downy fiber attached to its seeds, which has recently come into use so nearly universal for the various purposes of clothing, is of the same family as the common mallow; botanically considered, of the order *malvaceæ*, of the genus *gossypium*, of which the species, as modified by cultivation, are somewhat uncertain in their classification, the principal being *herbaceum* (the green-seed upland of the Southern States), *hirsutum* (the shrub cotton), and *arboreum* (tree cotton.) The cotton of Peru and South America generally is the *hirsutum*, growing bushy and stout, and living several years in temperate climates destitute of frost. The tree variety is from fifteen to twenty feet in hight, and is found in the East Indies, growing wild, and in South America, the staple long, strong, silky, and yellowish. There is so much variety, in different climates and latitudes, in the size and habit of the plant, the color of the flower and of the seed, the quality of the fiber, and other points of difference, that confusion arises in the classifications of botanists, in different quarters of the globe.

Much the larger proportion of cotton grown is produced in this country. Seven-eighths of the entire product of the world, it has been estimated, has been reached by our increased production. The East Indies occupy the next place, followed by South America (Brazil mainly), the West Indies, and Africa.

It has been used for the manufacture of cloth more than two thousand years, being first known in India, then introduced into Greece and the countries of the Mediterranean. It is now found in all tropical latitudes, and adjacent temperate localities in the United States south of 35°; in the West Indies; in South America down to Peru; in the Pacific Isles; in Australia, Japan, India, and China, and in nearly all explored portions of Africa.

The United States census for 1850 gave the average product per acre in unginned cotton, by States, as follows:—

Florida	250 pounds.
Tennessee	300 "
South Carolina	320 "
Georgia	500 "
Alabama	525 "
Louisiana	550 "
Mississippi	650 "
Arkansas	700 "
Texas	750 "

This statement shows the difference in soil, and the effects of wasteful culture in the older States; but it shows most conspicuously, also, the influence of climate, especially in the figures for South Carolina and Tennessee.—*Report of Agricultural Department.*

BARON VON LENK'S GUN-COTTON PATENTED IN THIS COUNTRY.

On the 4th of June, 1864, Baron Von Lenk procured a patent through the Scientific American Patent Agency, for the manufacture of gun-cotton by his process in the United States. The assignees of the patent in this country are Messrs. Rawson & Richmond, of Detroit, Mich., who announce their purpose to proceed at once to erect a large manufactory, and to embark in the production of the article. Their establishment will be under the charge of a practical and competent person sent over from Austria by General Von Lenk.

Our readers will remember that the commission of Austrian chemists came to the conclusion that "gun-cotton is far superior to gunpowder for all explosive power; that its use is less dangerous; that for artillery and small-arms one pound of gun-cotton will give greater result than three pounds of gunpowder, and for blasting and mining purposes 1 lb. of the former is equal to 6 lbs. of the latter; that damp does not affect it; that it is not liable to decomposition; that it will not explode short of 277° Fah.; that there is no smoke; that there is no fouling or refuse matter; that the recoil of the gun is but ⅔ of that from gun-powder; that lighter and shorter guns can be used; that the velocity of the projectile is greater and more accurate; that the heating of the gun is much less; and that there is no danger in its manufacture."

The statement that the velocity imparted to the shot is greater while the recoil of the gun is less, we should hardly believe except on further evidence than the report of one commission, however eminent.

In consequence of the general interest in this improvement we publish the patent in full. It contains a complete description of the process in as few words as possible.

IMPROVED GUN-COTTON.

To all whom it may concern:—

Be it known that I, Baron W. Lenk, of the city of Vienna, in the Empire of Austria, have invented a new and improved mode of making an explosive material out of cotton and other vegetable fibers; and that I do hereby declare that the following statement is a full and accurate description of the articles used, and the mode and manner of manufacturing the same, into an article which is termed, "Baron Lenk's Improved Gun-cotton."

First, The cotton or other vegetable fiber is first taken and spun into loose threads of sufficient strength to be easily handled.

Second, The cotton must then be thoroughly boiled in a solution of potash or of soda, in order to remove all greasy substances which the cotton may contain, and after thus boiled it may be exposed to the sun, or wind or in a heated room, to dry the same.

Third, The cotton must now be taken into a room heated to 100° Fah. in order to make it perfectly dry.

Fourth, A mixture is now made containing one part weight of nitric acid of $1\frac{48}{100}$ to $1\frac{50}{100}$ specific gravity, and three parts weight of common sulphuric acid. This mixture must stand in closed earthen or glass jars for several days, or until the two acids become fully mixed and cooled.

Fifth, This mixture of acids is now put into an apparatus containing three apartments, one for the main bulk of the acids, one for the immersion of the cotton, and one for receiving the cotton after being immersed. This apparatus may be made of cast-iron.

Sixth, The cotton is now taken and dipped in the acid bath, in said apparatus, in such a manner that every three ounces of the cotton must come in contact with sixty pounds of the mixture of acids, or in other words, the bath must contain fully sixty pounds of the mixture while parcels of three ounces of cotton are being dipped. The parcels thus dipped must be gently pressed, and the acids allowed to flow back into the acid bath, and the parcels are then put into the third apartment of the apparatus, where for every one pound of cotton there must be ten and a half pounds of said mixture of the acids. The cotton must remain in this state subject to the action of the acids for forty-eight hours, and the mixture must always have an equally strong concentration, and must be kept under a uniform temperature by a cooling process.

Seventh, The cotton is now taken out from the acids and pressed, and then put into a centrifugal machine to remove all surplus acids.

Eighth, The cotton is again put into another centrifugal machine, into which a constant stream of fresh water is admitted. This process is intended to remove the last particles of adhesive acids.

Ninth, The cotton is now taken and put into a flume or trough, and secured in such a manner that a running stream of fresh water may pass through and over it; and the same must remain in this situation for at least fourteen days. To lessen the time for this operation the cotton may be immersed or saturated in alcohol for the space of twenty-four hours. This process is also intended to extract all and the last particles of acids that may possibly adhere to the cotton.

Tenth, The cotton is now taken from the stream of water, or if from the alcohol it must be washed, and then boiled in a solution of common soap and again dried. This process is intended to restore the cotton to its original softness and appearance.

Eleventh, The cotton is now taken and immersed in a solution of water-glass of one pound to two pounds of soft water which must be $1\frac{09}{100}$ specific gravity of concentration. To one pound of cotton $\frac{198}{1000}$th of a pound of this solution of 46° Beaumè is required. The cotton is then taken out of this solution and exposed to the action of the atmosphere for at least four days. This process has the tendency to preserve the material, and also to make its explosive qualities less rapid.

Twelfth, The gun-cotton is again washed in soft water free of lime, dried, and can then be packed in wood or metal boxes for storage or exportation; and may be used for artillery. Torpedoes, shells, mining blasting, small-arms, and for all purposes where explosive power is required.

Thirteenth, All other vegetable fibers may be treated and manufactured as herein stated, which process will make the same explosive like the gun-cotton and adapted to the same purposes.

I claim as my invention an explosive improved gun-cotton made substantially as herein described,

BARON W. LENK.

City of Vienna, Austria, Dec. 1, 1862.

An American pint holds 7,000 grains of water.

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The Concentration of Power.

As the power of steam is the most universally applicable of all the forces used for driving machinery, its concentration becomes a matter invested with considerable importance. A great deal has been done in the production of small high-speed engines of late years, but a great deal more remains to be done before the principle can be regarded as approaching those limits, beyond which it may be neither safe nor prudent to carry it. The *Great Britain* locomotive has frequently given out 1,000 horse-power for many minutes together, with a pair of 18-inch cylinders, 24-inch stroke, the weight of the engine in working order being little over 35 tuns, or, with the tender, 50 tuns. This may, perhaps, be considered as a maximum effort which it would not be advisable to attempt to maintain. Taking the work done, then, at but half this, or 500 horse-power, we have still over 14 horse-power per tun; or, if we neglect the weight of the wheels as in no way necessary to the development of this power, we have at least 15 horse-power per tun of machinery. One of the steam fire-engines, tried last year at Sydenham, developed nearly 30 horse-power, the weight being under 50 cwt. This estimate of power does not pretend to strict accuracy, as the indicator was not used, and the power was calculated merely at an assumed pressure, some 20 or 30 lbs. less than that in the boiler. Still if we disregard the weight of the wheels, driving seats, etc., we find that the amount of power developed nearly equals that of a first-class locomotive, weight for weight. Modern express engines give out 350 horse-power as a matter of daily occurrence, and even goods' engines sometimes a great deal more. It is needless to say that in all these cases the power is obtained by an extremely high velocity of piston. In stationary engines, seldom confined in space, the march of improvement goes slowly, but, nevertheless, steadily on; and we trust ere long to see the clumsy beam and its appendages banished forever in favor of high speed engines, working expansively. The *Allen* engine, exhibited in 1862, inaugurated a change of practice, which is slowly making its way. This engine had a piston speed of 600 feet per minute, and ran 140 revolutions with an ease, steadiness, and absence of heating, not greater, perhaps, than was to be expected from the care taken in designing the machine to the minutest details, but very satisfactory, nevertheless, in that it furnished a complete refutation to arguments now and then brought forward, and dug up, as it were, from old-fashioned practice, to prove that a high speed engine must in the nature of things be a failure.

[There is a beam engine, 16-inch cylinder and 4 feet stroke of piston, of the Corliss pattern in Providence, R. I., which makes, day and night, 650 feet piston-speed per minute.—EDS.]

In order then, to concentrate power, it is only necessary to impart a high velocity to some member of a system of mechanism which first receives the direct effect of the original moving force, as the piston of a steam engine, or the bucket vanes of a turbine. No theoretical objections exist to the adoption of this course. The practical objections are found to reside chiefly in friction, and the difficulties met with in carrying out a complete and thorough system of lubrication. In the case of vertical spindles heavily loaded, and running at high velocities, it is necessary that the footstep should be worked to some curve, which will extend the bearing surface and prevent the extrusion of the lubricant. In the case of steam engines, the main-shaft bearing seldom gives trouble if properly made, especially if the weight of the fly-wheel is sufficient to keep the shaft down steadily in the lower brasses. The connecting rod head, with its brasses and crank-pin, are not so easily dealt with, and it cannot be denied that the annoyance which those occasion, has done much to retard the introduction of high-speed engines. The fact is, that the brasses will not permit of that amount of looseness or play which may exist in any other bearings almost, because of the destructive hammering action which ensues. It is not easy to say why tightening a brass should make it heat; we find in every-day practice that a bearing which supports perhaps 1 cwt. per square inch, without undue friction so long as it is left moderately slack, will become almost red hot in a few minutes, if an additional pressure of not more than a few pounds per square inch is brought on it by screwing down the cap. Until we can give a satisfactory explanation of this phenomenon, it is not easy to see how its occurrence can be guarded against. Meanwhile, it is the source of all the trouble ever met with from a connecting rod end. The best remedy appears to consist in increasing the surface very considerably, and providing an effectual method of lubrication, either by a telescope pipe from an overhead vessel of oil, or, in cases where the engine stands for a few hours out of the twenty-four, by boring a large cavity in the crank-pin, and filling it with tallow, a transverse aperture conveying the lubricant when melted to the surfaces where its presence is required. Attention to little matters of detail and good workmanship are really all that are required to insure the success of any motor running at a high speed.—*London Mechanics' Magazine.*

PETROLEUM FOR GENERATING STEAM.

We have received from R. A. Fisher, M.D., an analytical and consulting chemist of New Haven, Conn., a pamphlet giving an account of some experiments undertaken by him to ascertain the value of petroleum burned by Mr. Hill's method as compared with anthracite coal for generating steam. By Hill's process the petroleum is evaporated in a close box, steam is mixed with the vapor, and the vapor is burned as it issues from bat-wing burners.

Dr. Fisher burned petroleum by this plan "several hours" under a small boiler and measured the water evaporated. He then burned anthracite coal under the same boiler for four hours and thirty-five minutes, and measured in this case also the water evaporated. The steam was generated under a pressure of forty lbs. to the square inch, and hence from a temperature of 268°. After making proper allowances for the heating of the water the results were 7·81 lbs. of water, at 268°, converted into steam by 1 lb. of petroleum; 4·89 lbs. of water at 268°, converted into steam by 1 lb. of coal; or, 2,000 lbs. of coal gave the same heating power as 1,252·2 lbs. of petroleum.

"With coal at ten dollars ($10) per 2,000 lbs., it would appear from these figures, that petroleum of the quality used in the experiments just described, in order to compete with coal, must be furnished at ten dollars for 1,252·2 lbs. (198·69 gallons), or at 5·02 cents per gallon. But if burned in the apparatus of Mr. G. Hill, it must be furnished at a still lower figure; for while with coal the whole amount of steam generated can be used to drive machinery, in Mr. Hill's apparatus, a large proportion of the steam produced is required to assist the combustion of the petroleum.

"No experiments were made to determine exactly the quantity of steam thus employed, but from the fact that the coal evaporated but about four gallons of water per hour, while the petroleum evaporated about six gallons, without causing more steam to pass through the 'safety valve,' we must infer that the steam produced from two gallons of the water per hour (or about one-third of the whole amount generated), passed through the 'steam feeding pipe' into the retort, and thence to the burners.

"In view of all the facts elicited by these experiments, we cannot avoid the conclusion that at the present prices of petroleum and coal, say coal at $10 per 2,000 lbs., and petroleum at 40 cents per gallon, the cost of fuel in Mr. G. Hill's process, of burning the vapor of petroleum in contact with 'superheated steam,' is about ten times as great as when generating steam with coal."

Dr. Fisher concludes his pamphlet in these words:—"According to Mr. Tate, 'the oils (petroleum) as found in nature, contain as nearly as possible an equal number of equivalents of carbon and hydrogen.' This would make the composition of crude petroleum nearly identical with oil of turpentine. MM. Favre and Silbermann, in their refined researches already quoted, found the heat evolved by the perfect combustion of 1 lb. of turpentine to be sufficient to raise only 108·52 lbs. of water from 31°—212°. This, then, is about the maximum calorific power of crude petroleum—11·64 per cent greater than that of anthracite coal. Therefore, whether the perfect combustion of crude petroleum be effected by burning it directly, or after having converted it into gas; whether it be burned in the state of vapor alone, or mixed with air, or 'superheated steam' (as in Mr. Hill's apparatus), or though the mechanical arrangement consists of 'a series of corrugated recesses upon a vertical cone of cast-iron placed in the furnace' (as contrived by Messrs. Shaw & Linton), it is impossible to develope a greater calorific power than that with which it has been endowed by nature—that of heating about 108 times its weight of water from 32°—212°: a calorific power not quite 12 per cent greater than that of anthracite coal.

"It is therefore fallacious to suppose that at the present relative prices of coal and petroleum, this substance, by any 'improved method of burning,' can be made to generate steam as cheaply as coal. Of the truth of this, science has already convinced those who have faith in her teachings; accurate experiment will, in due time, convince those who are satisfied only with tangible evidence."

NEW BOOKS AND PUBLICATIONS.

THE INDICATOR AND DYNAMOMETER. Main & Brown. Henry Carey Baird, Publisher, 406 Walnut street, Philadelphia.

The intelligent engineer who aspires to become something more than a mere "stopper and starter" takes every opportunity to increase his stock of theoretical knowledge. For without a union of both practice and theory but little substantial progress can be made. In looking at a steam engine in operation we see nothing but the outward movement. It may turn its centers smoothly and without jar, and be apparently in excellent order; but when we ascertain what is transpiring within the cylinder, by means of the indicator, it may be found that twice the amount of fuel is consumed to do the work that is necessary.

It is for the purpose of ascertaining whether an engine is doing what it should that the indicator is provided, and no establishment that burns fifty tuns of coal in a year should be without one. Engineers should make themselves familiar with the instrument, and extend its use as much as possible; much greater economy in the use of steam would be the result.

The treatise which we have made the caption of this notice is a standard work, and is clear and lucid to those who study for information and not curiosity. It is illustrated with diagrams showing defects in engines, pointing out the cause and cure, and explaining the principle on which the indicator works, so that the student not only knows that the diagram is made in such and such a manner, but also *why* it is so made.

Every engineer in the country, not acquainted with the indicator, should send for this work and master it, and manufacturers should encourage their engineers to do so, for a thorough knowledge of the instrument will result in economy to them if it is practically applied. An advertisement can be found in No. I., Vol. XI., SCIENTIFIC AMERICAN.

PHRENOLOGICAL JOURNAL. Fowler & Wells, 389 Broadway, New York. $2 per annum, in advance.

The July number of this periodical commences the fortieth volume. A very marked improvement is visible in this number, both in appearance and character of the contents. The magazine, for such it now is, contains a great many handsome illustrations of military men and others in civil life, with dissertations on their characters, as shown by their crania. The general reader will find much to interest and instruct him.

Patent Breech-loading Tobacco Pipe.

In the list of English patents published in the London *Mechanics' Magazine* of May 20th, is this:—

2,424.—An improved mode or method of filling tobacco pipes of an improved construction.—G. R. Tilling and J. Park. Dated October 3, 1863.

In carrying out this invention the inventors fill or charge the bowl, head, or other tobacco-containing part of a pipe with tobacco from the bottom, the side, or the rear of such bowl, head, or other tobacco-containing part, in manner which will be wel understood as breech-loading. And to permit of such filling or charging, they construct pipes with apertures at the bottom, the side, or rear of the bowls heads, or other tobacco-containing parts, sufficiently large to allow a charge or "fill" to be passed in either under tobacco already lit in the pipe, or for filling before lighting, and such apertures they close by any suitable means,

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ICE-PERIOD IN AMERICA.

The last number of *The Atlantic Monthly* contains an article by Prof. Agassiz on the glacial epoch in America. Remains of tropical plants and animals found in the rocks of the polar regions prove that at one time the heat of the tropics extended over the whole globe, but at a period long subsequent to this —long even as geologists reckon time—the temperate zones of the earth were far colder than they are at present. The glacial epoch was next to the last before the advent of man, while it was preceded by forty-one others that have been examined and named, and perhaps each of these was as long in duration as itself.

In his article in the *Atlantic* Agassiz presents the proof that at the glacial epoch the continent of North America, as far south as the Ohio river in its middle portion, was covered with a mass of ice six thousand feet in thickness. This vast field of ice was constantly moving southward, with a slow motion, but with irresistible power, crushing the rocks, grinding down the hills, plowing furrows through the ledges, and covering the continent with a confused mixture of sand, gravel, and boulders.

This burying of the continent in ice to the depth of more than a mile, destroyed, of course, all life, both animal and vegetable, and through long ages the solitude and desolation of an Arctic winter prevailed over the land. After a time the returning warmth of the earth melted away the ice, and the retreating glacier was slowly followed by springing plants, and by swarms of insects, birds, and quadrupeds.

Agassiz thus presents the evidence of the glacier's thickness, extent, and use:—

"The slopes of the Alleghany range, wherever they have been examined, are glacier-worn to the very top, with the exception of a few points; but these points are sufficient to give us data for the comparison. Mount Washington, for instance, is over six thousand feet high, and the rough unpolished surface of its summit, covered with loose fragments, just below the level of which glacier-marks come to an end, tells us that it lifted its head alone above the desolate waste of ice and snow. In this region, then, the thickness of the sheet cannot have been much less than six thousand feet, and this is in keeping with the same kind of evidence in other parts of the country; for, wherever the mountains are much below six thousand feet, the ice seems to have passed directly over them, while the few peaks rising to that hight are left untouched. And while we can thus sink our plummet from the summit to the base of Mount Washington and measure the thickness of the mass of ice, we have a no less accurate indication of its extension in the undulating line marking the southern termination of the drift. I have shown that the moraines mark the oscillations of the glaciers in Europe. Where such accumulations of loose materials took place at its terminus, there we know the glacier must have held its ground long enough to allow time for the collection of these *debris*. In the same way we may trace the southern border of our ancient ice-sheet on this continent by the limit of the boulders; beyond that line it evidently did not advance as a solid mass, since it ceased to transport the heavier materials. But as soon as the outskirts of the ice began to yield and to flow off as water, the lighter portions of the drift were swept outward; and hence we find a sheet of finer drift-deposit, sand and gravel more or less distinctly stratified, carried to greater or less distances, and fading into the Southern States, where it mingles with the most recent river-deposits.

"One naturally asks, What was the use of this great engine set at work ages ago to grind, furrow, and knead over, as it were, the surface of the earth? We have our answer in the fertile soil which spreads over the temperate regions of the globe. The glacier was God's great plow; and when the ice vanished from the face of the land, it left it prepared for the hand of the husbandman. The hard surface of the rocks was ground to powder, the elements of the soil were mingled in fair proportions, granite was carried into the lime regions, lime was mingled with the more arid and unproductive granite districts, and a soil was prepared fit for the agricultural uses of man. Therefore I think we may believe that God did not shroud the world He had made in snow and ice without a purpose, and that this, like many other operations of His providence, seemingly destructive and chaotic in its first effects, is nevertheless a work of beneficence and order."

BORING TOOLS.

NUMBER 1.

There are two specific classes of tools for cutting metals. These are roughing and finishing tools. Others for different purposes, such as scraping, forming by pressure, and manifold uses, cannot properly be included under the head of cutting tools. To simplify this article we have considered the machinist's boring tools as divided into two kinds only, those for roughing and those for finishing.

A small hole can be more quickly made with a good drill than any other instrument, but this tool is only available for ordinary work. When we come to more exact and complicated jobs, the lathe must be used instead of the drill machine, and the boring tool, in one form or another, supplant the drill. With all roughing tools the object is to remove as much iron as possible in the shortest space of time with economy. The question of economy is not confined to merely driving the tool through the hole quickly, but also relates to the number of times the workman is obliged to go to the stone to renew the edge, or to the tool-dresser to have the same drawn down or tempered. If it be admitted that the fibers of wrought-iron, or the crystals of cast metals, must be cut and not abraded in working them, it is evident that there is but one mechanical power that will do this. That one is the wedge. To the wedge then is due all of the credit in accomplishing the object in question, but on the workman rests the responsibility of so placing the wedge that it will work to the best advantage. In this point lies all the difference between a good and a bad tool. This assertion must be strengthened by the supposition that the quality of the steel of both tools is the same and the workmanship identical in all other respects than the shape of the cutting edges. In one position the wedge cleaves particles asunder, in another it abrades, or does its work by scraping. These qualities are shown in the annexed diagrams, Figs. 1 and 2. It is not claimed as any original discovery of our own, but is only presented as a palpable and acknowledged truth among good mechanics.

Fig. 1

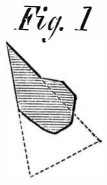
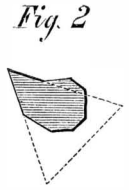


Fig. 2



In Fig. 1 we have a mere sectional elevation of a common boring tool. The dotted lines show the direction of the acute end of the wedge; Fig. 2 is a scraping-boring tool, which also shows the application of the principle alluded to. Very often the improper application or construction of boring tools makes the hole bored out taper, or small on the back end. The unskillful workman charges the lathe with the difficulty when the fault is often his own. A good boring tool will cut free, soft metal just as well inside of the hole as a turning tool properly made will out of it, but there are very many who are content to look on and see a boring tool grate a few miserable scraps of iron out of a hole. The process bears the same relation to cutting that rasping on a grater does to shaving with a razor.

Fig. 3

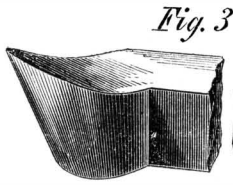
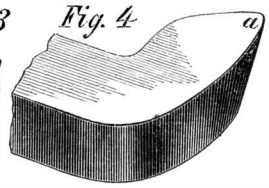
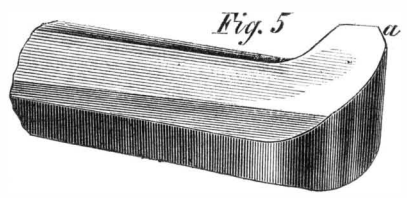


Fig. 4



Of these tools—respectively Figs. 3, 4, and 5, the mechanic will readily select the one which will cut the best, and on all metals, except brass, do the most work. The round, acute, sloping-edge draws into the work, instead of springing from it, and holds on to the metal, producing in wrought-iron and tough brass, long curling chips that leave the tool with but little heat or compression. Some workmen we are sorry to say, are so shiftless, or indifferent, that they would take the badly-made tool in preference to the proper one' Fig. 3. If a man be judged by the company he keeps a machinist may be rated by the character of his tools, and his work will show faithfully whether they be of a proper or improper shape. The shank of Fig. 3 is made square or as nearly so as possible. In that form it is stiffer than in any other, and the only rounded part of it is the angle furthest from the edge. This is rounded to clear the work, for sometimes when a boring tool rubs at this point the cutting edge is forced in, the size enlarged, and the job spoiled. This is not the case with the other tool, Fig. 5. It is one of a class in common

Fig. 5

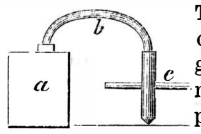


use and is not well adapted to the work required of it. An angle at the cutting edge (as at *a*), tends to force the tool off its cut, and to make the hole taper, as explained in a previous paragraph. The strength of the shank is lessened by being made octagonal, and the clearance in front is so slight that the tool often rubs at this point and produces a bad surface. The chips from it are stiff and corrugated and look as if they were (as they are), ground out instead of being cut, and the whole form is objectionable. How much pleasanter it is to work with a tool like that shown in Figs. 3 and 4; to have it well tempered, dressed and sharpened, and to drive it through the hole as fast as the nature of the work will allow it to go!

A STEAM ENGINE FOR THIRTY-ONE CENTS.

One of our learned professors tells us that when he was a boy he made a working steam engine at an expense of thirty-one cents, and perhaps some of our young readers would like to know how it was done.

He took an empty powder canister, *a*, and inserting a perforated cork into the opening, pressed the end of a small lead pipe, *b*, into the hole in the cork.



The lead pipe terminated at the opposite end in a Barker-mill engine, *c*. The construction of this mill by a tinman was the principal cost of the machine. It was made by soldering a horizontal tube across a vertical tube so that the interiors of the two were in open communication with each other; the ends of the tubes being closed. The lower end of the vertical tube terminated in a conical step, and where the pipe entered at the upper end it was surrounded by tow or picked rope, stuffed in steam-tight and greased so that the tube could revolve with little friction. A minute opening was made in the side of each arm of the horizontal tube near the end—the holes being in opposite sides. The canister was nearly filled with hot water before the cork was inserted, and when the water was made to boil by placing a lamp under it, the engine revolved with great velocity.

A mill like this might be made to turn a spit or to grind coffee. A saw mill in this city was driven nearly twenty years by a mill of this form, though constructed, of course, of more substantial materials.

SURGICAL INSTRUMENTS CONSTRUCTED OF ALUMINUM BRONZE.—M. Morel-Lavalle has recently made a very favorable report to the Paris Society of Surgery upon a pocket-case of instruments fabricated by MM. Robert & Collin of aluminum bronze, consisting of ninety-five parts of copper and five of aluminum. All the instruments except the blades are made of this material, and they may advantageously replace silver in many cases, and in others iron or even steel. The alloy is not oxidizable, and preserves its brightness amidst the various agents it is brought in contact with in daily practice.

A SMALL CRAFT.—The brig *Vision*, the smallest craft that ever attempted to cross the ocean, sailed on the 26th of June for Liverpool. The dimensions of the vessel are: length of keel, 15 feet; breadth of beam, 4 feet 6 inches; depth of hold, 2 feet 6 inches.

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TORPEDOES USED BY THE REBELS.

For the following very interesting information concerning rebel infernal machines we are indebted to a correspondent with the James River Expedition; his name is not given for obvious reasons.

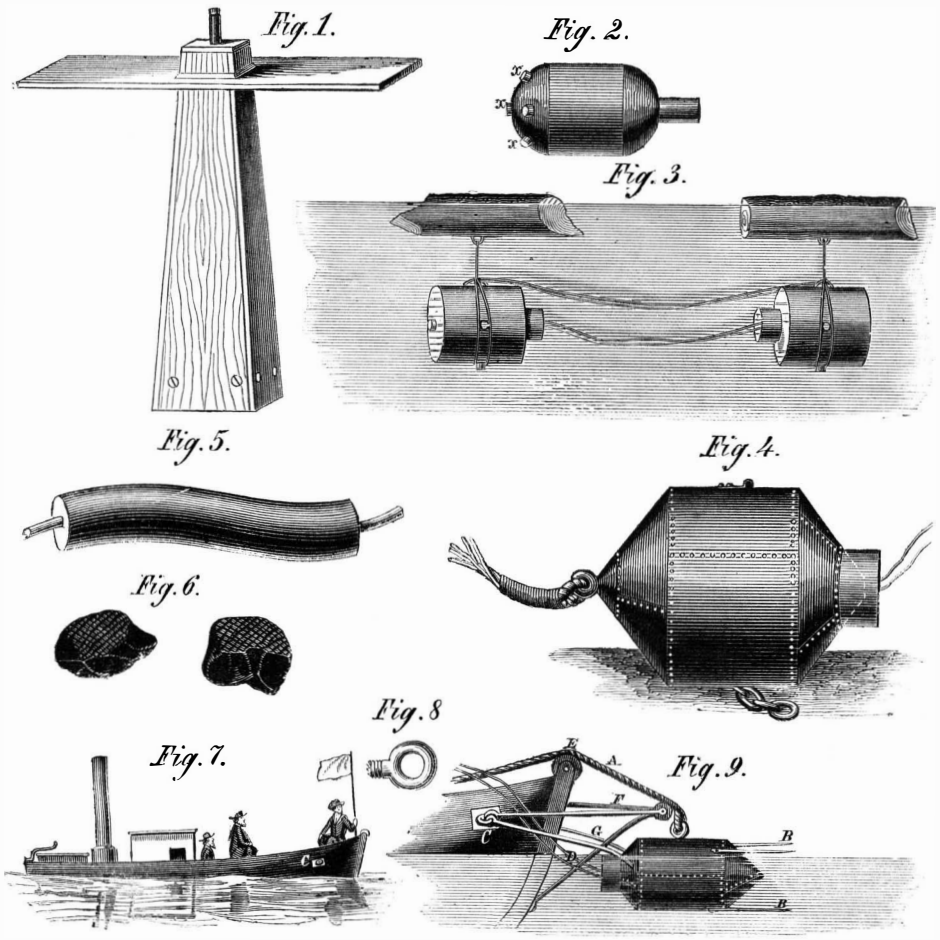
EXPEDITION UP JAMES RIVER, June 11, 1864.

MESSRS. EDITORS:—Supposing it may not be an uninteresting topic, after reading the article on "Submarine Batteries," on page 282, Vol. X., SCIENTIFIC AMERICAN, it occurred to me that I might communicate to you some facts relative to the various torpedoes found by our vessel and others of this fleet.

But, first, let me remark that the cause of the rebel steamer not being promptly pursued after exploding the torpedo under the *Minnesota*, on the 9th of April, 1864, was owing to the fact that a tug which was lying alongside the *Minnesota* had not sufficient steam up to chase the vessel. Our vessel (the ——— ——— is a fast side-wheel craft, and could have overtaken the rebel easily, in the right direction—James river. But we were not hailed or ordered alongside the *Minnesota* until half-past 3 A. M.; and not until 7 A. M. were we sent with the *Commodore Perry* (a slower craft) up Nansemond river—a fruitless search.

It has since happened that, on the 14th of May, while lying at the point where the *Commodore Jones* had been blown up 8 days before—waiting for the *Stepping Stones* to raise a torpedo—a small rebel propeller, about 25 feet long, answering the description of the one that tried to destroy the *Minnesota*, came down under a flag of truce. We had heard her occasionally on the river puffing, before day-break, about a mile or two above us. In Fig. 7 I have given a representation of her; Fig. 9 shows her probable method of attaching a torpedo and then casting off from it by cutting the rope, A, backing a short distance and exploding it by means of the connecting wires. My reasons for supposing that this is the mode of attachment of the torpedo to the bow of the boat are these:—I noticed the rope, A, and pulley, E, also the plate, C, on the bow of the boat, and imagine it was intended to receive an eye-bolt, Fig. 8, to which the rods, F and G, are attached. In the affair of the attack on the *Minnesota*, after replying to the hail, the tug stopped a moment, then suddenly steamed under full headway, bow on, for the *Minnesota*, thrusting the torpedo forcibly against the ship, thereby causing the spikes, B, to fasten themselves firmly in the timbers; then, on cutting the rope, A, the tug was instantly detached from the torpedo and backed rapidly to a safe distance, and the powder fired by means of the wires, D, either by pulling them or using a galvanic battery. The suddenness with which the rebels worked, no doubt, took the officers of the *Minnesota* so by surprise as to render them incapable of prompt action. For it was done in probably half the time it will take to read this description.

Of the torpedoes, eleven were found by our vessel, and six by others; two of the largest size (Fig. 4) were rendered harmless by breaking their connections, though they were left in the river. Fig. 1 is a floating torpedo, made of tin, covered with wood; it is five feet high and contained 30 lbs. of powder. We found eight of them. Fig. 2 is made of copper, and is intended to be sunk to a certain depth and exploded by contact, being supplied with five percussion caps, *x*; the machine is to contain about 50 lbs. of powder; it is two feet long. Fig. 3 represents two made of tin; they are floated about two feet under water, suspended to short logs, and lashed together by cords, *a*; the wires, *c*, are also united. The torpedoes are 14 inches long and 13 inches in diameter, and are intended to be exploded by friction primers and pulling wires, *c*, and contained each 66 lbs. of powder. We found two of them. Fig. 4 is the "daddy" of torpedoes; it is made of half-inch boiler-iron; 33 inches outside diameter, length 4 feet; cylindrical length 22 inches; it contained 1,015 lb. of powder (size of grains shown in Fig. 6); it was designed to destroy a monitor. The one that destroyed the *Commodore Jones* was of this size; it was fired by means of insulated wires (of the size shown in Fig. 5), which were laid to some secret covert or in the bank of the river where a rebel constantly laid on the look-out for one of our vessels. Finding that there was danger of our discovering him and spoiling his fun, Britton (the rebel) concluded he would blow up the *Commodore Jones* for want of a monitor, particularly as the small boats, in dredging with grapples, had already found his wires and were then pulling at them at the risk of displacing them.



REBEL TORPEDOES.

While he was deciding what to do and immersing his galvanic battery in the bath, the *Commodore Jones* had probably been lying over the spot some five minutes. The position of the torpedo had been kindly pointed out to us by an old colored man; and why Capt. Wade, the commander of the vessel, knowing its position so perfectly, should go to the spot and stop directly over it, is more than I can understand, as he always had the good and safety of his men at heart. The entire middle of the boat was blown up 50 or 60 feet into the air, killing about 35 of the men and wounding 25 others. We were about the distance of one or two city blocks away, yet the sound of the explosion was so muffled by the water that I did not hear it. The poor negro was sent on board the *Shawsheen*, and was either killed or captured on the next day (May 7th) with that unfortunate vessel. If captured, we know that he soon met a horrible fate at the hands of our merciless foe.

After starting ahead again, the fleet delayed 29 hours over the first torpedo, and 3 or 4 more over the next three. Hence, when the attack commenced on Chapin's bluff—the outworks of Fort Darling—we were just 45 hours too late to assist Gen. Butler.

Each of our vessels in advance is supplied with a torpedo holding about 50 lbs. of powder on a 30-foot pole projecting from our bow.

New Method of making Bread.

Good bread is a good thing and one not so easily obtained. A correspondent of the *American Agriculturist* says she can make good bread, and tells others how to do it. She says:—

"Instead of protracted agony of twelve or eighteen hours, it will only be a pleasant exercise of a few minutes in making it—just two hours for raising—and baked in fifty minutes, and then out come the loaves, so round and light, so tender and sweet, the whole household will be delighted. The first thing, and last in fact, is proper temperature, both while making it and in process of raising. Without heat, internal as well as external, fermentation cannot be rapid enough. Then heat two bricks to 100° or more, and place the pan you make the bread in on them, and so knead and work in the heat with the materials. And now, though the great army of bread-makers stand up in flour-y array against me, and even shake their doughy fingers at me, I shall not wince or 'abate one jot.' 'Success is the test of merit,' as the world goes, and this past delusive notion that after bread is light once, it must forsooth be molded over into loaves and set to work again, is all nonsense. It often induces sourness, certainly multiplies labor, and takes time. Well, then, have two tins well greased (butter is hopeless in these days) and divide the dough equally. (I use two quart tins, which, of course, requires two quarts of flour and over for a loaf) and set them to rise by the stove on the hot bricks, with a piece of carpet over the bricks to moderate the heat, and then well cover with warm woolens. In two hours it will be rising like Aladdin's palace, and when fairly brimming full, place it in your oven, and you will soon have as delicious bread to eat as one ought to expect out of Paradise. I claim this as original, and only ask you to follow these directions and give us the result. Thus bread-making ceases to be the tax on time and patience it usually is, and the harassing doubts and fears one usually goes through with while following the old method, are quite done away with. I could say much on the philosophy of baking bread, in adjusting the 'golden mean,' which, after all, is half. A peep into some of the closed ovens would, I fear, call out the exclamation of the dogs in Landseer's picture of 'too hot, too hot.'"

[These instructions are so plain, and the results promised so great, that they are worth trying.—EDS.

Combustion of Gunpowder in a Vacuum.

The eminent French chemist, M. Bianchi, is the author of some curious experiments of the combustion in a vacuum. He found that this substance, and also the fulminates, burned quickly if loose in an exhausted vessel, and suddenly brought to a temperature exceeding two thousand degrees. If, however, the powder was placed, under similar circumstances, in a pistol, it inflamed with the suddenness exhibited in the air. Gun-cotton slowly disappeared; the layer nearest the source of heat going first, but without the production of any light. In all these cases the products of combustion were the same as in air. Combustion also took place in nitrogen, carbonic acid, and other gases which do not support it, with little diminution of the ordinary rapidity of the process.

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Correspondence

New Steamship Enterprise.

MESSRS. EDITORS:—It is seventy-five years since John Fitch experimented successfully with his rudely constructed steamboat on the Delaware river, making a speed of eight miles per hour, and when, with proud emotions, he remarked to his invited guests, "This gentlemen, will be the method some future day of crossing the Atlantic;" and for which bold piece of prophecy the ingenious Fitch was, of course, liberally credited with being quite crazy.

More than fifty years ago, Oliver Evans advanced the idea of constructing steamboats for transatlantic navigation, of great length and proportions for buoyancy and light draught; and discarding the principal requisites in the model of a sailing vessel, contending that such steamers would run at a moderate expense, not load too deeply with fuel and cargo, or light up too much from the consumption of fuel on a passage or for want of cargo, and make great speed.

At intervals, for many years past, some one or other of intelligence upon the subject, but with power or influence limited to the use of the pen, have discussed through different journals the propriety of the adoption of similar principles for ocean steamers as a profitable investment.

A contributor to the SCIENTIFIC AMERICAN, of an early date, says:—"Build a ship of say, 450 feet in length, 56 feet breadth of beam inside the paddle-boxes, with not more than 22 feet depth of hold, with a long flat floor and small 'dead rise.' A vessel thus constructed will not sink at her load lines (14 feet) more than one inch for every 100 tuns of coals placed on board; and as her consumption of fuel in ordinary passages across the Atlantic will not exceed 1,000 tuns at the utmost, it follows that she will not be sunk so as to load her wheels at the commencement, nor lighted up at the termination of her voyage, so as to prevent her engines acting with full power and efficiency. Such a boat, with engines of properly graduated power, could be driven with safety 17 knots per hour in an ordinary sea-way, making the passage from here to Southampton, in all ordinary weather, inside of eight days, on a consumption of fuel not exceeding 800 tuns of coals."

Though Americans are generally ready to accept improved principles connected with mechanical or commercial science, they seem to have adhered with great tenacity to the practice of applying steam for ocean navigation to the form of vessels adapted chiefly to sailing. This, however, may be accounted for in the fact that the organization of sea-going steamers has hitherto been the work of commercial parties, whose antecedents have been connected with sailing ships or packets, and were therefore afflicted with the disease of "spars and canvas" on the brain; the consequence is, that they have been spending fortunes of money in fuel to force their ships through a great depth or density of water, and a resisting atmosphere or perhaps head wind, and with an army of sailors whose chief employment at sea, in fast ships, consists in hauling the yard-arms about in order that they may "stick" the wind to the best advantage.

But daylight is dawning, and there is hope that even within the period of the present generation we may be able to cross the Atlantic with a degree of comfort not very inferior to that experienced on the great *St. John*, or a Long Island Sound steamer, and in such case who would be so bold as to predict the extent of population afloat between the New and Old World?

I have been examining the prospectus of a new company, entitled the "United States and European Express and Passenger Steamship Company," whose design it is to build a line of steamers to run weekly trips between this city and England, making the passages within eight days. The boats are to be of large capacity, but light draught of water, not exceeding 18 feet, and of 9,000 tuns measurement, to be propelled wholly by steam, with four sets of engines that may work together or independently of each other; but in either case giving motion to two paddle or side-wheels of ordinary construction; and two screw propellers, one under each quarter of the vessel—commonly known as "twin screws"—capable of using an aggregate of 2,500 horse-power nominal, or 9,000 indicated. As their sectional area of resistance will be only 930 square feet, the boats can of course make enormous speed, and in the ordinary or average state of the Atlantic can make the passage in not much over six days, if it is thought best to use the available power.

An important feature of the boats will be their great longitudinal strength, which will be derived from what seems to be intended as two "hog-framed bulkheads," extending the whole length of the ships. This is a feature which I believe is wholly omitted in the present transatlantic steamers, the absence of which must account for their breaking up so readily when they unfortunately come in contact with some rocks, or even sometimes a sandy bottom. There are points, however, in the details of their machinery, as far as described in the prospectus, which I think are fit subjects for discussion, and as the scheme is one of great public interest I shall beg, with your permission, to refer to it in your subsequent numbers.

SEABIRD.

New York, June 23, 1864.

Further Details concerning Key-seats.

MESSRS. EDITORS:—Please find herewith three dollars for the SCIENTIFIC AMERICAN, for one year, commencing July 1st. You can consider me a life subscriber. Among some twelve or thirteen papers and periodicals that I take, none are received with half the pleasure that the SCIENTIFIC AMERICAN is; in fact no other publication is to be compared to it. I noticed on page 341, Volume X., a diagram giving the size that key-seats should be made. I would like to make a suggestion which, perhaps, every one has not thought of. The seat in the shaft should be made deeper than the one in the wheel or pulley, whereas the contrary is more generally the case. The tendency of the wheel is to hang back, thus giving the key a twisting strain, and providing the shaft and wheel are both of the same material and both seats the same depth, it would be much the easier to break out the iron on the shaft than from the wheel when both seats are the same depth; I have often seen work spoiled by cutting large seats in the wheel, and only a "flattened" place on the shaft.

C. C. HALLADAY.

Utica, La Salle county, Ill., June 3, 1864.

[Mr. Halladay has forwarded us a diagram with his letter, but we are so pressed with work of this class that we cannot execute it. Our mechanical readers will understand the point and appreciate its importance, as we do.—EDS.

A Visit to our Office.

MESSRS. EDITORS:—As this is the third time I have employed your firm in getting out patents, and you have succeeded with each application, and if I had fifty more to apply for I should most assuredly employ your firm in preference to any other in the United States, it is a duty I owe to your firm to make some public acknowledgments for your untiring perseverance for all who employ you. Your Scientific Patent Agency is the best and surest, and has the greatest facilities for procuring patents of any in the country, therefore I do earnestly recommend your establishment to every inventor. Having paid a visit a year or two ago to New York city I stepped into the office of Messrs. Munn & Co., to see their extensive establishment, and I was surprised to see the machinery in their building. I think a failure to procure a patent through their Agency almost impossible.

JOSEPH HOUGH.

Westchester, Pa., May 2, 1864.

MISCELLANEOUS SUMMARY.

THE steam-plow has been introduced upon the fertile plains of Australia. It is stated that one and a half acres can be plowed with ease, by working up to medium speed. No particulars are given of the machinery, but great hopes of its success were entertained by those present at the trial. Steam plowing must eventually be a practical fact in this country.

CALIFORNIA SILK.—The soil and climate of California are admirably adapted to the growth of the mulberry tree, in all its desirable varieties, to the breeding and feeding of the silk-worm, and to the production of silk, more so than almost any European country, owing to the fertility of the soil and dryness of the climate, giving a peculiarly rich and nutritive character to the leaves of the mulberry tree, which imparts a higher, finer, and more delicate quality to the silk produced from them. Certificates from the highest authorities in Europe show that the California silk, after being fully tested, carefully analyzed and compared with European silk, proves to be of the very best quality.

A SILLY FRENCHMAN.—A Frenchman in London recently conceived an entirely new style of self-destruction. He first bought an egg in the market, extracted its contents (by "suction"), and filled the shell with gunpowder. Then going into a very crowded thoroughfare he placed the egg in his mouth, and "touched it off" with a match. Instead, however, of blowing his head to atoms, the powder, when ignited, merely poured forth a stream of fire and smoke from the aperture in the shell, but without doing any harm to the man. The astonishment of the passers by at beholding a human mouth suddenly become the crater of an active volcano, may be imagined.

THE following manufacturing concerns in South Boston paid government taxes during the year ending May 1: Bay State Iron Co., $24,076 50; Downer Kerosene Oil Co., 52,121,32; Felton & Waters, Distillers, 29,669 18; Harvey & Morris, Brush Manufactory, 1,481 13; R. Hoe & Co., Printing Press, 1,555 32; James P. Ingols & Co., Brass Foundry; 1,041 09; Francis H. Jenney, Oil, 7,092 55; Naylor & Co., Wire Works, 13,810 94; New England Roofing and Manufacturing Co., 1,755 43; Libbey & Howe, Glass, 2,299 05; South Boston Iron Co., 14,350 33; Suffolk Glass Works, 2,466 05.

GOOD NEWS FOR LOVERS OF PEACHES.—The Trenton *Gazette* says that the peach crop promises to be large this year—the largest ever raised in New Jersey. "In Monmouth and Ocean counties we hear of no drawback to a large yield so far. The veteran producers of Monmouth county predict a crop above the average. Benj. Reed, of Heightstown, has 180,000 trees in Ocean county that are in bearing, and is preparing to send to market 224,000 baskets. A friend, whose judgment we think is good, informs us that the fruit crop of New Jersey, south of the Raritan Bay, from present appearances will be very large."

THE Meriden Britannia Company, of West Meriden, Conn., have nearly completed a new brick building, over 360 feet long and 40 wide, with a wing 95 by 40 feet. This, in connection with their other buildings, it is said will render the establishment the largest in the world for the manufacture of German silver, white metal, plated and Britannia ware. The company employ about 500 hands, and will commence work in the new building about the first of September.

SAFETY-VALVE REGULATOR.—We secured a patent Feb. 9, 1864, in behalf of Messrs. Huntington & Robertson, of Alexandria, Va., for a safety-valve regulator, which is advertised in another column. The invention has since been tested, and letters in our possession from those who have used it assure us that it is really a valuable improvement.

IT was stated in the French Corps Legislatif that the iron-clads *Magenta* and *Solferino* cost from five millions francs to five and a half each. The *Couronne* cost more, because it was all iron, and in France building in iron is more expensive than building in wood.

THE Granite Mill at Fall River, when completed, will be the finest structure of the kind in that city. The main building is 328 feet long by 70 wide, and 5 stories high. It will contain 840 looms, and 35,328 spindles.

IMPLEMENT TRIAL.—The Iowa State Agricultural Society announce a grand trial of farm implements and machinery at Burlington, on Sept. 26, the day preceding the State Fair.

A NUGGET of gold was recently found in New Zealand weighing 50 ounces.

THE yield of gold in Australia and New Zealand for 1863 is near $40,000,000

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RECENT AMERICAN PATENTS.

The following are some of the most important improvements for which Letters Patent were issued from the United States Patent Office last week; the claims may be found in the official list:—

Hydraulic Quartz-crusher.—In this machine the common Chillian traveling crushing wheels are employed, and the patentees have hit upon the novel idea of placing water buckets upon the sides of the wheels, thus converting them into water wheels. The buckets are supplied from a small tank above, which rotates with the wheels, the tank being filled by a suitable conducting trough. When the water is let on, the wheels travel around in the usual circular quartz trough, without assistance from any other motor. The water is prevented from entering the quartz trough by an ingenious arrangement of aprons. John H. Perkiss and David Gay, Long Bar, Yuba county, Cal., are the patentees.

Spinning Machine.—This invention removes difficulties which occur in the use of many or most domestic spinning wheels. It is necessary, in reeling on these useful machines, which are still found in general use in the Southern and Southwestern States, to raise the spindle on account of the low position of the wheel, and this could only be done by removing the carriage from the railing, and perhaps thereby throwing off the bands. Again, when the band which drives the spindle is to be crossed, it has to be done by cutting it, and then crossing it and sewing it together again. This invention avoids the first difficulty by connecting the spindle frame to its carriage in such a way as that it can be elevated at pleasure without disturbing any of the machinery, and the second by making the boxes in which the spindle runs removable, so as to take the spindle out with ease and without deranging any of the adjustments of the other parts. Charles A. Moorehead, of Quincy, Ill., is the inventor of this machine.

Knitting Machine.—This invention consists in furnishing the bobbin of a knitting machine with a movable piece of steel or other metal or material, so applied within a recess on one side that while there is more than a very few coils of yarn upon the bobbin, the said piece is thereby confined in such a position that it will not interfere with the lock of the stop motion, but that when the yarn has nearly given out, the said piece will be projected so far from the bobbin by a spring or other means as to be caused, by the operation of the machine, to come in contact with the lock and unlock it, thereby leaving the automatic belt shipper or its equivalent free to throw off the belt from the driving pulley, or otherwise put the machine "out of gear" and produce its stoppage. Joseph Dalton, of 103 East Houston street, is the inventor of this improvement.

Iron-clad or other Vessels.—This invention consists in improvements in the construction and shape of the nose of the ram; also in the use of a stand-pipe closed by a valve in its bottom and extending above the water line in such a manner that a convenient egress for divers is afforded from the vessel, for the purpose of removing torpedoes or effecting other submarine operations. Further, in forming the after part of the vessel with double ogee lines in such a manner that room is afforded for the side-screws and rudders within the bilge line of the vessel, and that said parts are fully protected against accidents or against the effect of a hostile attack; also in concentrating the chains or ropes of two or more rudders on one central drum in such a manner that by the motion of this single drum two or more rudders can be operated simultaneously; also in the employment or use of a rod extending from the steering drum to the throttle valve of the steam engine in such a manner that by turning said drum the pilot from his stand is enabled to throttle the steam at any moment without giving a signal to the engineer; also in two or more turn-tables, each provided with a series of guns in combination with an iron-clad casemate completely covering and protecting said guns and turn-tables and provided with a series of ports in such a manner that each gun can be readily trained to any point of the compass, and one gun can be loaded while the other is being discharged; further, in the use of an oblong cylindrical casemate with an arched roof, in such a manner that great strength is combined with ample room to work the turn-tables and the broadside guns; also in a port-closer, consisting of two sliding doors hinged to spring levers, which are placed in an angular position in such a manner that the muzzle of the gun, when brought in contact with said levers in the act of running out the gun, will open the port, and when the gun recoils said port will close automatically. Finally, in the application of a movable top to the pilot-house in combination with one or more screws, in such a manner that said top can be raised when the vessel is not in action to admit fresh air, and when preparing for action it can be readily fastened down. Captain R. G. McDougall, at the Allaire Works, 466 Cherry street, New York, is the inventor.

Universal Smoothing Plane.—The body of this plane is composed of a series of separate blocks, held together by an exterior band and screw. By loosening the screw the position of the blocks may be changed at pleasure, and the bottom surface of the tool may thus be made to assume either a convex, concave, or horizontal line. The instrument is therefore adapted to the planing of all concave, convex and horizontal surfaces, and promises to be a most valuable acquisition to the general stock of carpenters' tools. S. Williams, inventor, 2048 Winter street, Philadelphia, Pa.

Applying Safe-Locks.—The object of this invention is to obtain a means whereby locks may be applied to the doors of fire-proof safes without being affected by the moisture emanating from the filling between the double walls of the door. This filling is applied in a moist state, and the dampness has hitherto proved very detrimental to the locks, causing them to need repairs in a very short time and at considerable expense, owing to the difficulty in removing the locks from the doors. This invention, while it fully protects the lock from dampness, also admits of its being removed from the door with the greatest facility and without the aid of a mechanic, so that the lock may, when it requires to be repaired, be removed by the owner, and sent to a locksmith and again applied at a comparatively small expense. Thomas Dolan, of Albany, N. Y., is the inventor of this improvement.

Photographs.

We have had occasion in previous numbers of the Scientific American to allude to the perfection this art has reached in the hands of its professors, and we are often in the receipt of large and handsome pictures, accompanied by friendly letters, speaking in terms of praise of our journal. The latest gift of this kind comes from Mr. John A. Whipple, of 96 Washington street, Boston, Mass. This gentleman has recently taken a large group of 500 or more Russian sailors and officers with great fidelity and accuracy. The sheet is some 14 by 16 inches, and the individual faces, although not larger than this letter, O, could be readily identified by friends or acquaintances. There are also two other photographs of the same size, representing the Russian frigates, which are distinct as to outline and agreeable as to tone. These pictures will serve as pleasant mementoes of the visit of the Russians to this country, and are to be carried abroad by them as specimens of the skill which our artists have attained in this line.

SPECIAL NOTICES.

Richard Montgomery, of New York city, has petitioned for the extension of a patent granted to him on Oct. 29, 1850, for an improvement in corrugated boilers.

It is ordered that the said petition be heard at the Patent Office, Washington, on Monday, Oct. 3, 1864.

Rene Charles Demolon & George Alexander Charles Thurmeyssen, of Paris, France, have petitioned for the extension of a patent granted to them on Jan. 13, 1851, for an improvement in treating fish for manure and oil.

It is ordered that the said petition be heard at the Patent Office, Washington, on Monday, Dec. 26, 1864.

All persons interested are required to appear and show cause why said petitions should not be granted. Persons opposing the extensions are required to file their testimony in writing, at least twenty days before the final hearing.

A Gold and Silver Working Model of the Steamer "Commonwealth."

A gold and silver model of the steamer *Commonwealth*, of the Stonington line of Sound boats to Boston, has just been completed, and will be sent to the Philadelphia Sanitary Fair for exhibition. This is one of the most beautiful models of the kind ever made. In its construction seventy-three ounces of gold were used, and two hundred and fifty-two ounces of silver, and skilled mechanics have been employed upon the work for six months, at an aggregate cost of six thousand five hundred dollars. The length of this model is thirty-one inches, and it is an exact copy of the steamer *Commonwealth*, made by measurement upon a diminished scale of three thirty-seconds of an inch to the foot. The workmanship is most elaborate. Not only the smoke-stacks, flag-staffs and deck machinery are carefully copied, but the panels of the saloons, the window shades, and all the intricate and delicate handiwork which appears on the steamer, are accurately represented. This piece of workmanship is supplied with machinery and music, and will undoubtedly be one of the features of the Philadelphia Fair.—*Exchange.*

What it Costs to launch a Big Ship.

The expense of launching a large ship is very great. By the failure to send the *Puritan* down the ways heavy expenses were incurred which were entirely lost. The time occupied in laying the ways was about seven weeks, and upwards of two hundred men were employed on the day of the launch, each of whom were paid $5. The ways are laid crowning or arching, twelve inches in the length of them, but when the weight of the ship comes on them they straighten out. Eight coats of white zinc paint have been applied to the *Puritan's* hull below the water-line. It was stated to us, by a person in a position to know, that the cost of launching this particular ship would have been $5,000, if all things had worked satisfactorily. As it is, the expense is very nearly doubled by the failure. Some time must elapse before the ship goes into the water.

The Public Debt of the United States.

The Secretary of the Treasury furnishes, in answer to a resolution of the Senate, a statement of the public debt of the United States to June 14, 1864, making the total amounts as follows:

Debt bearing interest in coin,	$837,941,091 80
Debt bearing interest in lawful money,	379,700,802 58
Debt on which interest has ceased,	370,170 09
Debt bearing no interest,	501,383,104 41
Total,	$1,719,395,168 88
Annual interest in coin,	$50,823,672 45
Annual interest in lawful money,	20,876,057 70
Total interest,	$71,699,730 16
10-40 bonds,	$70,239,250 00
Three year 7-30 notes,	118,577,650 00
United States notes outstanding,	432,041 330 00
Fractional currency outstanding,	21,031,948 85

The remainder of the debt bearing no interest is mainly unpaid requisitions.

Railroad Battery.

An army correspondent gives an account of the latest rebel machine discovered by our signal corps:

"When first seen upon the track at Bottom's Bridge, it looked like a car in a locomotive, roofed with a singular covering. But soon the roof was turned down vertically, disclosing itself as a mail proof shield, perforated with a port-hole, behind which a large pivot gun was mounted. The locomotive keeps up steam constantly, and stands upon the road near a curve, emerging from which it can sweep the railroad for a mile, covering the railroad bridge of the Chickahominy, and retreat again to its cover, in which it is entirely beyond the reach of our guns. An account of this same machine had been given by a contraband from Richmond, but it had never been seen until now."

Mr. C. S. Hubbard, of New Haven, Conn., is still receiving subscriptions for Parson Brownlow's paper at $2 per year, or $1 for six months. Those of our readers who desire to subscribe should forward their money as above directed.

Nail Machinery.—R. Hamilton, Dayton, Ohio, wishes to communicate with parties who can supply the most approved machinery for cutting nails.

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Improved Process of making Turpentine.

The advance in price from 50 cents to $3 20 per gallon of a commodity so indispensable as spirits-of-turpentine, naturally excites an interest among inventors and among dealers in the article, either to procure a substitute, or to cheapen the product by improvements in the manufacture. The largest use of spirits-of-turpentine has been for drying paints, but since access to the pine regions has been closed by the war, most painters have latterly resorted to the use of petroleum naphtha in its place. As the turpentine, however, makes better work, some of our best painters continue to use it, notwithstanding the enormous price at which it is held.

In view of the great desirableness of increasing the product of spirits-of-turpentine from the yellow pines of the North, we are on the constant watch for improvements in the process of manufacture, and finding in the Patent Office the model of an apparatus invented by Seth L. Cole, of Burlington, Vt., which seems adapted to this purpose, we present an illustration of it to our readers.

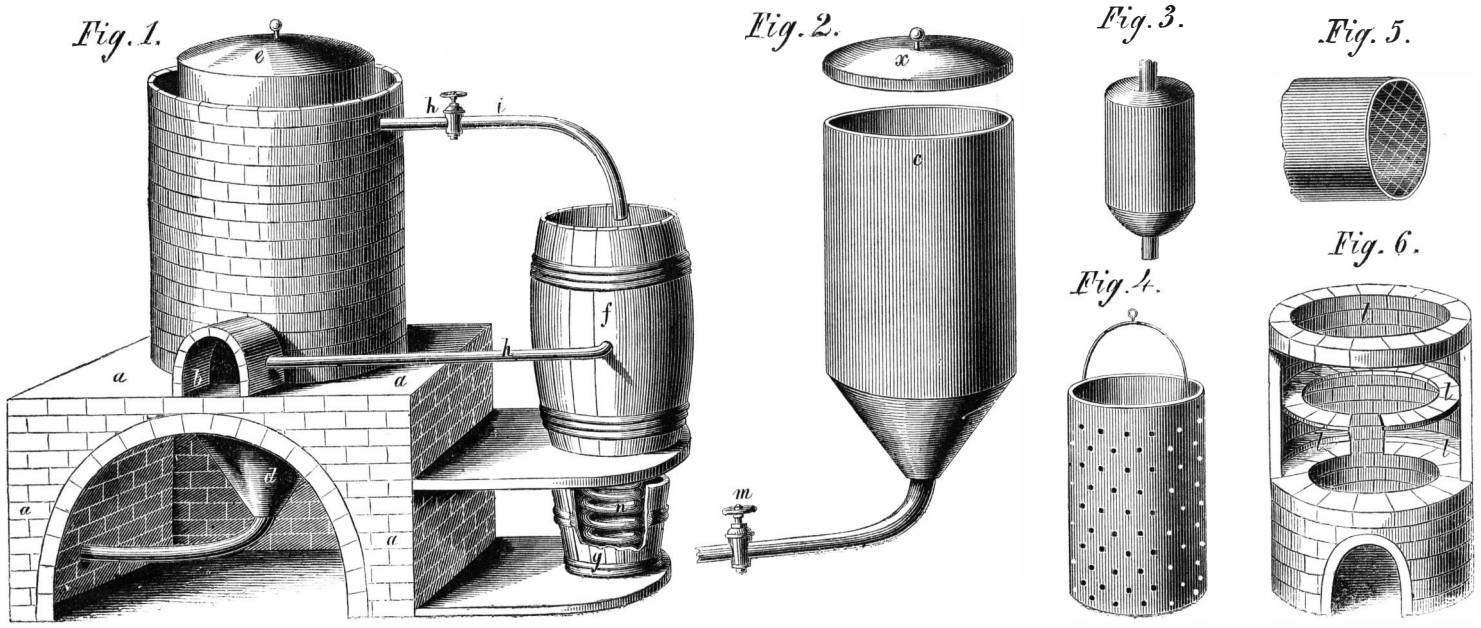
By the usual method, pitch is collected by chopping boxes or pockets in the trunk of the pine, and as these become filled the contents are dipped out with a wooden ladle. In the process here illustrated the whole of the wood is subjected to distillation, by which means a much larger immediate yield is obtained.

The wood is cut into lengths of from 12 to 18 inches and split in pieces 1½ to 2 inches square. The iron skeleton basket (Figs. 4 and 5 of the annexed engraving) is filled with these pieces, and placed in the retort, Fig. 2, which is closed by the cover, *x*, the joint being luted air-tight to prevent the escape of vapor. The working position of the retort, *e*, is seen in Fig. 1, where it is set in brick-work, provided with a furnace for heating it to evaporate the oil.

A moderate fire is kindled in the furnace, *b*, by which the oil is evaporated. The vapor passes out through the pipe, *i*, which is led into the cask, *f*, where it enters the gas-holder, Fig. 3. The cask, *f*, is supplied with a current of cold water which condenses the vapor; the uncondensable gases being led by the pipe, *h*, into the furnace where they are burned as fuel. From the lower end of the gas-holder a pipe passes down into the lower condenser, *g*, where it is coiled in the form of a worm, *n*, and surrounded with cold water to complete the condensation.

The condenser, *e*, extends below the furnace, to prevent the too great heating of the resinous sediment, and terminates in a cone, *d*, a pipe being provided to lead off the melted rosin. After the fire has been continued from six to ten hours, the oil will begin to be discolored, when the stop-cock, *h*, is closed, and the stop-cock, *m*, is opened. The heat may now be increased, when the remainder of the pitch will be expelled from the wood in the form of tar, and the wood will be charred.

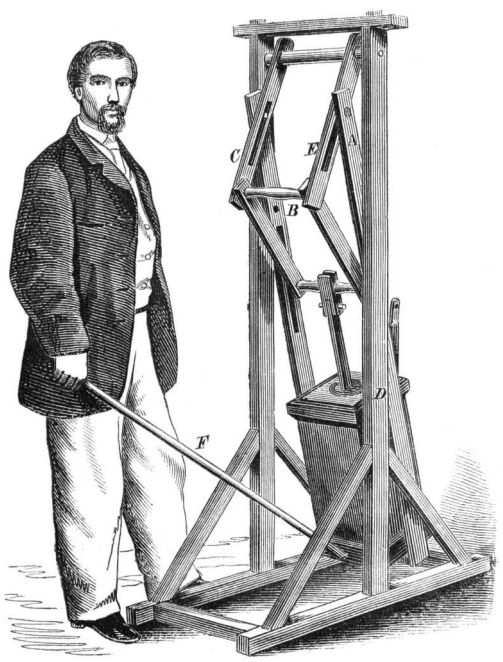
Fig. 6 represents a series of furnaces, *l l l*, to be set in brick-work like that of *a a*, Fig. 1; the apparatus being thus duplicated or multiplied to any extent.



PROCESS OF MAKING SPIRITS-OF-TURPENTINE.

LEWIS'S OSCILLATING CHURN.

The mechanical action of this churn is different from anything we have examined before, and the inventor claims that it is very efficient for the purpose; being easy to operate, and thoroughly separating and breaking the globules so that the butter is made in a remarkable short time. The churn is attached to the bars, A, which are swung on centers at B. The top of the bars, A, is connected to a frame, C, also jointed to the main frame, D. This frame consists of two sets of arms connected at the center by a working joint, and at the bottom to the churn-dasher. A slot, E, in the upper set of arms permits the pin in the bar, A, to transmit motion to the churn-dasher. It will be seen that when the churn is pushed from or drawn towards the operator by the rod, F, the contents are subjected to two actions, one of which is the result of the swinging motion, and the other caused by the reciprocating action of the dasher. By



these two motions the cream is thoroughly agitated, and a superior article of butter produced in a much shorter time than by the usual methods. This churn is easily cleaned and kept sweet, and has no parts liable to get out of order—a feature of much importance in machines of this class. It can be moved from place to place without difficulty, and occupies but little room when not in use. This churn can also be converted into a cheese-press of the most powerful character by a very simple alteration, involving no more cost to the purchaser.

A patent for this churn was obtained through the Scientific American Patent Agency, on the 7th of June, 1864; and further information may be obtained of the inventor, George Lewis, Panama, N. Y.

SIGHTING FIELD GUNS.

It is well known to artillerists that the nature of the ground very often interferes with a correct sight, if one wheel of the carriage is higher than the other the surface must be leveled until both are on a plane; this operation not only takes time but requires the services of an experienced officer of artillery to set the gun in battery. At the front where sharp-shooters abound, many a piece is disabled before it gets fairly to work, and the necessity of leveling the ground as mentioned previously, becomes a serious disadvantage. A convenient and simple arrangement for obtaining a correct site on a gun, no matter in what position it may be, has long been desired and artillerists have acknowledged that it would be a very great addition to their profession.

Major Robert Smith, of the 70th Artillery, has been experimenting with a small instrument for this purpose, and has shown us a model with which he states that he has made accurate shots with the gun carriage in all positions, and that one wheel may stand 45° higher than the other without interfering with the accuracy of the shot. It is also advantageous in that any person without previous instruction can make a line shot at the first trial. When the gunners are all picked off as they are in close action, this becomes a matter of importance and will no doubt prove valuable to the service. Major Smith desires to associate himself with some persons who will take a pecuniary interest in his invention and bring it to public notice, as from its nature it is eminently calculated to prove valuable to the Government. Major Smith refers to General Duryea; and a machine can be seen at this office. The Major's address is at 64 Prince street, Brooklyn, N. Y.

New Method of taking Portraits.

A new era in portraiture is predicted from the discovery of a Mr. Swan, who presents a solid, life-like likeness of any one, inclosed in a cube of crystal. The effect of the new process is to exhibit the subject of the portraiture with life-like verisimilitude, in natural relief. You take up a small case, and look through what appears to be a little window, and there stands or sits before you, in a pleasantly-lighted chamber, a marvelous effigy of a lady or gentleman, as the case may be. The projection of the nose, the molding of the lips, and all the gradations of contour, are as distinct as if an able sculptor had exercised his skill; but the hair and the flesh are of their proper tint, and the whole thing has a singularly vital and comfortable look. Indeed, were it not for the reduction in size, it would be difficult to avoid the belief that an actual man or woman, in ordinary dress, and with characteristic expression, was presented to your eye. The "Swan system" is about to be introduced into this country.

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VOL. XI. NO. 2....[NEW SERIES.]....*Twentieth Year.*

NEW YORK, SATURDAY, JULY 9, 1864.

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PAPER FROM CORN HUSKS.

For many years the Austrian Government have encouraged a series of experiments made to test the value of Indian-corn husks for making paper, and from the manufactured samples we have seen it appears that so far as the practicability is concerned the scheme has been successful.

It is apparent that some substitute for rags is very much required, for the supplies are yearly becoming scarcer; more particularly since the war, when the cotton market has been so scantily filled. Certain kinds of the softer woods are now used to a great extent in the manufacture of paper, and the peculiar machines and processes necessary to work this substance have been brought to great perfection; and wood-paper may, in time, supply a portion of the demand for the ordinary purposes of business at a cheap rate.

Paper, it is well known, can be made from a variety of substances; but the cost of manipulation is in many cases too great to make them available. It is one objection urged against the use of corn husks for paper that the stock commands at this time a very high price, seven or eight cents per pound, simply for use in mattresses, and that if brought forward as a substitute for rags, the demand would run the price up immediately. Be this as it may the Austrian Government now makes paper of a superior quality from corn husks alone and puts it into the market against rag-paper. The Government has an advantage which paper-makers in this country have not, and that is in being able to purchase rags at first hands, so to speak; the great ports from which they are sent to this country are chiefly in Austria or the immediate vicinity. There are, moreover, other points in the manufacture of paper from corn husks which render an investigation into its value important. The process of reducing the pulp or fiber from which the paper is made, leaves the stouter fibers or skeleton of the husk uninjured, and these are easily woven into strong stout cloth, or a fabric resembling crash toweling. Still another resultant, besides the paper stock and fiber is obtained. This is the starch contained in the husk, which is all saved, pressed into square cakes. and afterward ground into flour from which bread has been made. If not desirable for this use here, it is certainly valuable for feeding animals. It is therefore clear that the corn husk is capable of a variety of uses, and it is important that it should receive serious attention. It is not reasonable to suppose that the Austrian Government are spending time and money in the pursuit of a chimera, and if it can be made an article of commerce in that country, there is no reason why we too should not reflect upon this subject.

If we sleep upon mattresses made of husks, it is plain that by intelligent management we could turn the material to much better advantage and use the fibers for bags; we may extract the life-supporting principle, and set free the paper stock to go abroad to our countrymen in the shape of weekly journals, and yet have mattresses from some other and cheaper material.

These are not schemes which we have briefly alluded to, but only an incomplete record of the uses to which the maize plant is now put in Austria. Rolls upon rolls of the cloth are manufactured annually, and it is both stout and strong; a sample can be seen at this office. The great question to be looked at is simply—Will it pay? The obvious inference is that if the Austrian Government finds it advantageous to foster establishments for using corn husks in this manner, manufacturers in this country may at least examine into it with profit. If it shall be found (and we are sanguine it will) that corn husks can be put to better uses than feeding cattle or stuffing mattresses, a very great field is open for the development of a new source of individual and national wealth.

THE HECKER AND WATERMAN EXPERIMENTS.

For the benefit of our new subscribers we will briefly state that this is an elaborate series of experiments being conducted at 239 Cherry street, in this city, by Henry Waterman, at the expense of George V. Hecker, to ascertain the actual advantage of working steam expansively, in a cylinder both with and without a jacket of steam. The cylinder is made of steel plate 1-10th of an inch in thickness, and is surrounded by a similar plate, the space between being 3-8ths of an inch thick. The whole is then secured in an ordinary cast-iron cylinder. The experimental engine has a cylinder 10 inches in diameter with 2 feet stroke. Experiments are tried with the space between the two cylinders filled with steam, and then under the same conditions without steam in this space. The engine is also worked as a condenser and as a non-condenser. For each experiment the engine is run constantly 30 hours, observations being recorded every hour. To give a full idea of the character of these observations we publish the headings of one of the 30-hour sheets, with a few of the hourly records, and the observations and computations which are made on each sheet:—

MARCH 18, 1864. STEAM IN HEATERS.

Hour.	Counter. Number.	Counter. Rev'n per min.	Steam in Boiler.	Thermometer. Room.	Thermometer. Feed tank.	Thermometer. Hot well.	Feed tank steam chest.	Water from steam chest.	Water from heaters.	Vacuum.	Coal.	Barometer.
5 P. M.	966200	60·63	38	68	80	97	h.m. 41	lbs. 12½	27¼		lbs. 360	29·65
6 "	966838	60·96	37	69	88	90		13½	27¼			29·65
7 "	160	61·20	36	69	87	90	8-15	13	27¼			29·65
8 "	4132	61·96	36	70	89	88	lbs.	14	27¼			29·65
9 "	7782	60·83	36	69	89	90	5	13¼	27¼			29·65
10 "	11500	61·96	36	69	87	91	5	13¼	27¼			29·65
11 "	15214	61·90	36	70	89	90	9-45	13	27¼			29·65
12 "	18916	61·70	37	70	89	90	11-15	12½	27¼			29·65

The observations are recorded in the same way for the 30 hours, when the ashes are weighed and deducted from the weight of the coal used. The figures in the columns are then added, the means calculated, and the pounds of water evaporated per pound of coal and per pound of combustible are computed and recorded.

IN the month of May three locomotive boiler explosions occurred on English railways. It is reported that in every instance the dome has been the seat of failure.

METAL-WORKING.

The perfection to which metal-working has attained is one of the miracles of modern times. Tools cut iron and brass at speeds which, fifteen years ago, would have been pronounced unattainable with economy. In gun and pistol factories and in sewing machine shops the various pieces are turned, milled, sawed, planed, or ground in such quantities and with such unfailing accuracy as to command the admiration of the observer Not only have the tools been greatly improved in their character, but the material worked upon has also undergone important modifications ; by this we mean the processes to which it is subjected before it is worked by cutters. Steel is annealed so thoroughly that its character as a tough, tenacious, and stubborn metal is wholly destroyed, and it becomes as tractable, so to speak, as the softest iron. Its virtue is not destroyed by this operation, but changed, and the temper is restored again at will.

It is important to remember that these improvements in working metals were not reached by conjecture, or by a single bound; but by successive steps and careful experiment. Whatever advantages we enjoy over other nations as skillful workmen is due wholly to the skill and intelligence of our artisans, and it is no hyperbole to say that they are indeed the bulwarks of the nation.

THE GOVERNMENT STEAM EXPERIMENTS.

The Commission is moving steadily forward in the prosecution of these experiments. On starting the engine it was found that the arms of the fans which furnish the resistance were not quite strong enough, and they are being made stronger. Mr. Allen, the head of the Commission, is satisfied that the fans are going to prove a very perfect resistance for the purpose of experiment; being adjustable to any amount of resistance desired, offering a resistance which is perfectly uniform, and which can be measured with accuracy in foot-pounds. It is the intention to try the effect of cutting off steam at different points in the same cylinder, the effect of different areas of ports, of different leads, and of all other matters connected with the working of the steam engine which it is desirable to know, and which can be ascertained by means of the extraordinary facilities placed by the Government in the hands of this Commission.

CHARLES WYE WILLIAMS ON HEAT AND STEAM.

There are two classes of writers—clear-headed men and muddy-heads. The first embraces all of the great minds, and numerous others who, with fewer ideas, yet understand distinctly everything that they think they understand. When this class of men attempt to convey their ideas they generally use short, simple words ; and they always use words whether short or long, with a perfect understanding of their exact signification. One of the charms of Macaulay's matchless style is the manifest fullness of his appreciation of the precise meaning of every word and phrase which he employs. The same is observable in the writings of Sir John Herschel, of Dr. Lardner, of Faraday, of all the great masters of science.

The muddy-heads are not all by any means destitute of intellect. Some of them have a great many ideas, but their ideas are always vague, undefined, and without distinctness. When men of this class attempt to speak or write, the meanings which they attach to their words and phrases are generally as vague as their ideas. The most perfect specimen of this class is Charles Wye Williams. He has written a book of 278 pages on Heat, Water, and Steam, which has been republished by the great industrial publisher, Henry Carey Baird, of Philadelphia.

The vague way in which Williams uses language is forcibly shown in a paragraph on page 32 of his book. There are three phrases which he has occasion to use very frequently in his discussions—these are *latent heat*, *atoms of water*, *and units of heat.* Now each of these has a definite meaning which has been perfectly established by general use.

Latent heat is the heat which disappears when a body changes from the solid to the liquid state, or from the liquid to the gaseous state. To talk about the latent heat in ice, or in any solid, is nonsense.

An *atom of water* or of ice is formed by the com-

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bination of one atom of hydrogen with one atom of oxygen; the atom of oxygen weighing eight times more than the atom of hydrogen. But how many of these atoms it takes to make a pound nobody knows. They are too small to be seen or to be weighed singly.

A *unit of heat* is the quantity of heat required to raise the temperature of 1 pound of water 1 degree.

Mr. Williams contrives to put all three of these phrases into a single sentence, and to employ each in a sense different from that which general use has assigned to it—a sense peculiar to Mr. Williams, which he does not explain, and which we suspect must be very vague in his own mind.

"The quantities of heat inherent in water in each of its three states are, in the general opinion of chemists, as follows, viz.: the *latent heat* of ice, 40°, that of liquid, 140°, and that of vapor, 1,000°. The first two are supposed to be ascertained by certain physical tests; the last, however, can only be received as an approximation to what *cannot be determined with certainty.*

"If, then, the maximum heat contained in ice be 40° latent and 82° sensible, the inference would be that each atom of the crystallized mass, on receiving an additional unit of heat, would have its statical conditions altered; that, losing its crystallized form, it would separate from the mass, and become part of a fluid or liquid body."

Using words in their ordinary signification, there is no latent heat in ice, and if an atom of ice should receive an additional unit of heat it would become part, not of a liquid body but of a gas, it would be steam superheated; or, more probably, it would be decomposed into the two atoms, one of oxygen and the other of hydrogen, of which it was formed.

NEW YORK MARKETS.

[WEEK ENDING JUNE 30, 1864.]

Ashes—Pot, $12; pearl, $14 per 100 lbs.

Beeswax—68c. to 70c. per lb.

Bread—Pilot, navy, crackers, 4¾c. to 8c. per lb.

Candles—Adamantine, stearine and sperm, 29c. to 55c. per lb.

Cement—Rosendale, $1 50 per barrel.

Coffee—Java, 49c. to 50c. per lb.; Rio, 43c.; St. Domingo, 38c. to 40c.

Copper—American ingot, 46½c. to 50c. per lb.; bolts, 60c.; Sheathing, 62c.

Cordage—Manilla, 23c. per lb.; Russia—tarred, 22c.; American, 17c.

Cotton.—Ordinary, $1 12 per lb.; Middling, $1 46; Fair, $1 56.

Domestic Goods.—Sheetings, brown standard, 62c. per yard; Shirtings, brown, 7-8, standard, 45c.; Prints, Merrimack 33c.; Prints, other 27c. to 32c.; Flannels, 50c. to 90c.

Dyewoods, Duty Free.—Fustic, $52 50 to $55 per tun; Logwood, $30 to $62 50; Lima Wood, $175.

Feathers—78c. to 80c. per lb.

Furs.—Otter, $4 to $10 skins; Lynx, $3 to $5; Muskrat, 25c. to 40c.

Flax—16c. to 22c. per lb.

Flour and Meal—$8 50 to $11 20 per barrel; Rye Meal, $7 25 to $8 25.; Corn Meal, $7 50 to $8.

Grain.—Wheat, $2 10 to $2 40 per bushel; Rye, $1 80; Barley, $1 35 to $1 50; Oats, 91c. to 98c.; Corn, $1 52 to $1 60; Peas, $1 45 to $1 60 Beans, $2 67 to $2 90.

Hay—$1 35 per 100 lbs.

Hemp.—American (dressed), $275 to $315 per tun; Russian, $400; Jute, $310 to $320.

Hides.—City Slaughter, 13½c. to 14c.; other varieties range from 15c. to 36c.

Honey.—$1 30 to $1 60 per gallon.

Hops.—18c. to 30c. per lb.

India Rubber.—40c. to 98c. per lb.

Indigo.—Bengal, $2 to $2 60 per lb.; others, $1 20 to $2 30.

Iron.—Scotch pig, $70 to $72 50 per tun; American, $62 50 to $68; Bar—Swedes —; English, $190 to $200; Sheet—Russia, —; English, 9c. to 11½c.

Lead.—American, $14 50 to $14 75 per 100 lbs.; English. — Pipe, 19½c.

Leather.—Oak-tanned, 49c. to 59c. per lb.; Hemlock, 27c. to 51c.

Lime.—$1 35 to $1 80 per barrel.

Lumber.—Spruce, $21 to $23 per 1,000 feet; White Oak, $35 to $40; White Oak Staves, $120 to $200; Mahogany crotches, 80c. to $1 50 per foot; Rosewood, 4c. to 12c. per lb.

Molasses.—75c. to $1 15 per gallon.

Nails.—Cut, $7 50 per 100 lbs.; Wrought, 35c. to 41c. per lb.

Oils.—Linseed, $1 58 to $1 60 per gallon; Sperm, $2 01 to $2 25; Petroleum, crude, 47c.; refined, 76½c. to 90c.; Naphtha, 36½c. to 90c.

Provisions.—Beef, mess, $15 to $16 per barrel; Pork, mess, $40 to $43 25; Butter, 28c. to 42c. per lb.; Cheese, 13c. to 20c.

Rice.—$8 75 to $12 per 100 lbs.

Salt.—Turk's Island, 60c. per bushel; Liverpool fine, $4 50 per sack.

Saltpeter.—20c. to 25c. per lb.

Spelter.—15¼c. to 15¾c. per lb.

Steel.—English, 16c. to 42c. per lb.; German, 15c. to 23c.; American cast, 25c. to 30c.; American spring, 16c. to 19c.

Sugar.—Brown, 18c. to 23c. per lb.

Tea.—65c. to $1 65 per lb.

Tallow.—American, 16½c. to 16¾c. per lb.

Tin.—Banca, 70c. per lb.; English, 60c.; plates, $19 to $25 per box.

Tobacco.—Leaf, 12½c. to 30c. per lb.; Cuba fillers, 60c. to 85c.; United States wrappers, 25c. to 65c.; Manufactured, 55c. to 70c.

Wool.—American Saxony fleece, 95c. to $1 00 per lb.; Merino, 90c. to 95c.; California, 20c. to 48c.; Foreign, 25c. to 60c.

Zinc.—25c. per lb.

ISSUED FROM THE UNITED STATES PATENT-OFFICE FOR THE WEEK ENDING JUNE 28, 1864.

Reported Officially for the Scientific American.

☞ Pamphlets containing the Patent Laws and full particulars of the mode of applying for Letters Patent, specifying size of model required and much other information useful to inventors, may be had gratis by addressing MUNN & CO., Publishers of the SCIENTIFIC AMERICAN, New York.

43,276.—Wheel Vehicle.—Rodney W. & Samuel Ackley, Lima, Mich.:

We claim the screws, s, the nuts, o, the rods, t, and the rest, d, the whole constructed, arranged, and operated in the manner and for the purpose substantially as herein set forth.

43,277.—Washing Machine.—Joseph Adams, Janesville, Ill.:

I claim the employment or use of a double-inclined board, B, in connection with the two rollers, F F, arranged with the yielding bars, E E, lever frame, D, uprights, d d, and bar, C, or their equivalents, to operate in the manner substantially as and for the purpose set forth.

In combination with the above I also claim the slats, c, at the ends of the suds-box, A, as and for the purpose specified.

[This invention consists in the employment of pressure rollers connected with a lever frame in a novel manner, and used in connection with a double inclined clothes-board fitted in a proper suds-box, having cleats secured to the inner surfaces of its ends; the lever frame being arranged in connection with upright guides, and all so arranged that the clothes are acted upon in the most favorable manner for their perfect cleansing from dirt, both the rubbing and squeezing operations being gone through with in the washing process.]

43,278.—Kiln for annealing Glass.—Thos. B. Atterbury, Pittsburgh, Pa.:

I claim, first, A leer or kiln for annealing glassware constructed with a depressed arch, having inlets and outlets for the glass combined with the endless closed carriage and circular railway, substantially as described.

Second, Depressing the circular arch at or near the chimney, E, substantially in the manner and for the purposes described.

Third, A leer for annealing glassware which is so constructed that the ware is subjected to an intense but nearly uniform heating process in passing through one portion of the annealing chamber of the leer, and is then subjected to a gradually cooling process in leaving the point where the chimney-flue is located, substantially as described.

43,279.—Washing Roller.—James E. Atwood, Trenton, N. J.:

I claim the arrangement and combination of the handle, A, and rollers, D D', with the end pieces, B B', also the arrangement of the shield, C, all substantially as described for the purposes set forth.

43,280.—Self-acting Felt-guide for Paper-making Machines.—Theodore Baker, Stillwater, N. Y.:

I claim the cam, A, and journal box, B, when used in connection with the guide roll, C, as a self-acting guide for felt cloths, and wire cloths, of paper-making and other machinery, in its passage over the rolls, in the manner described and for the purpose specified.

43,281.—Tool for riving Splints.—Wm. Baker, East Templeton, Mass.:

I claim, first, The wedge-shaped knife, B, with an oblique or square cutting edge, and made adjustable in the stock, A, substantially in the manner and for the purpose specified.

Second, The adjustable face or sole, C, in combination with the stock, A, and knife, B, constructed and operating in the manner and for the purpose substantially as herein specified.

[This invention relates to an improvement in that class of tools which are used for the purpose of making splints for baskets, chair-bottoms, and other articles.]

43,282.—Rake for Harvesters.—John Baldwin, St. Paris, Ohio:

I claim, first, The crank-wheel, G, connected with the toothed wheel, E, by means of the clutch, b, the swinging arm, N, pitman, O', and shaft, P, to which the rake is attached, all being arranged as shown, to communicate a reciprocating motion to the rake, as set forth.

Second, The bent lever, R, in connection with the segment ledge, V, spring, l, and shaft, P, with the rake pivoted to the latter, and all arranged to operate in the manner substantially as and for the purpose specified.

Third, The placing of the rake-head, U, in a tube, T, having a longitudinal slot, p, in its under side, substantially as and for the purpose set forth.

[This invention relates to a new and improved raking device, such as are commonly termed "automatic," for harvesters, and it consists in a novel means employed for operating the rake, as well as in a novel construction of the rake itself, whereby the cut grain may be raked from the platform in a perfect manner, the gavels being laid or deposited evenly on the ground, to facilitate the binding operations. The invention also consists in the employment or use of a roller placed over the rake, and arranged in such a manner as to prevent the rake, when on the platform, from interfering with the cut grain being properly laid or deposited thereon.]

43,283.—Fire Escape.—A. T. Ballentine, New York City:

I claim, first, The combination of a sliding ladder with an outside shutter, which is made to contain it when folded, and a main shutter, substantially as shown.

Second, Locking the sliding ladder, when folded in its case, by means of the stump, D, constructed and operating substantially as shown.

Third, The sill, C, and its sliding platform, constructed substantially as shown.

Fourth, The system of toggle joints, s and u u, to move the sliding platform out, substantially as described.

Fifth, The false hinge, O, and its shank, q, operated by means of the outside shutter, substantially as described.

[This invention consists of a ladder combined with one leaf of a window shutter so as to be concealed within it, being slid up within it by means of a wrench, and allowed to slide down to the ground whenever a catch is released. The catch or locking apparatus is connected to a false window-sill in such a way as to draw it out and make it project from the sill as soon as the ladder is released from the shutter, and thus furnish a platform from which to reach the ladder.]

43,284.—Breech-loading Fire-arm.—Fordyce Beals, New Haven, Conn.:

I claim, first, The combination and arrangement described of the lever, L, and spring lever, P, for the purpose specified.

Second, The combination and arrangement described of the lever, L, hook, O, and hammer, for the purpose specified.

43,285.—Sewing Machine.—Franklin H. Brown, Chicago, Ill. Ante-dated June 18, 1864:

I claim, first, The combination and arrangement of the feed bar, F, the eccentric, m, the fulcrum, v, and the lever, G, slide, I, and dove-tailed race, H, arranged and operating substantially as shown and described.

Second, I claim the combination and arrangement of the shuttle-carrier, A, sliding upon the pin, x, the wheel, C, and face plate, E, operating as and for the purpose specified.

43,286.—Clamp for Clothes-wringers.—J. D. Burdick, Ashway, R. I.:

I claim the combination of the wringer frame, A, screw-clamp, a B C, and hinge, D, when the said hinge extends from top to bottom of the clamp frame, and the various parts are constructed, arranged, and employed in the manner herein shown and described.

[This invention relates to an improvement in fastenings for securing clothes-wringers to wash-tubs or wash-trays. The invention is more especially designed as an improvement on the fastening of the "Eureka Clothes-wringer," so called, and which was patented by D. W. Swift, Jan. 28th, 1862,]

43,287.—Bottom of Wash-boilers.—Charles Burnham, Springfield, Mass.:

I claim, as an article of manufacture, a bottom for boilers, made of sheet metal and corrugated but with a plain margin or lip surrounding the corrugations, as herein-before set forth.

43,288.—Corn Plow.—L. H Castor, Eddington, Ill.:

I claim, first, Moving the standards, i i, of the plows, I, laterally by means of the bail-shaped bar, J, bent levers, K K, and treadles, L L, all arranged substantially as herein set forth.

Second, The combination of the bars, C C, frame, D, driver's seat, E, rock shaft, F, links, d d, and levers, G c, all constructed, arranged, and employed, substantially as described, for raising the plows when required.

[This invention relates to a new and improved means for adjusting or moving the plows laterally, so that the same may be made to conform to the sinuosities of the rows of corn to prevent the plants being plowed out of the ground while the implement is being drawn along; and the invention also relates to an improved means for raising the plows out of the ground when desired, and also to an improved draught attachment by which the draught is equalized.]

43,289.—Braiding Attachment for Sewing Machines.—Horace H. Chittenden, New Haven, Conn.:

I claim, first, The spindle, a, with one or more fingers, b c, and guide, f, when the same are made to operate in combination with the needle of sewing machines and its operative mechanism, substantially as and for the purpose specified.

Second, The combination and arrangement described of the spindle, a, segmental guide, f, and yoke, i, or its equivalent, substantially in the manner and for the purpose herein set forth.

Third, The lever, 7, pins, 10 and 11, and dogs, 14 and 15, when the screws are combined and arranged to operate together, substantially in the manner specified.

Fourth, The lever, 7, and slide, 4, in combination with the fingers, b c, substantially in the manner and for the purpose described.

43,290.—Washing Machine.—C. A. Clark, Pulaski, Iowa:

I claim the combination of the box, A, lever, C, rod, D, plunger, E, perforated bottom, G, spigot, I, vertical strips, L, and hook, J, constructed, arranged, and operating in the manner and for the purpose specified.

43,291.—Elevating and transporting Device.—E. B. Coffin, Olneysville, R, I.:

I claim the curved bar or beam, E, mounted on wheels and provided with a windlass composed of the shafts, O H, connected by the gearing, M N, and operated through the medium of the gearing, I J, crank, K, and pawl, L, in connection with the brake or strap, W, attached to the foot lever, Y, and the pawl, R, and lever, S, or their equivalents, all arranged to operate substantially as and for the purpose specified.

[This invention relates to a new and improved implement or device for elevating and transporting articles from place to place, and is more especially designed for building stone walls, in which large stones are employed; the stones being elevated by the device from the ground and carried in a suspended state to the wall in course of construction and deposited thereon.]

43,292.—Mode of preventing the Potato Rot.—Christopher Corey, Lima, Ind.:

I claim the invention of counteracting and remedying, in the tubers themselves, the potato rot, as a specific disease, caused primarily by insects and animalcules, and secondly by the infectious fluid and gases of the potatoes thus affected, by the direct destruction of the former, and by the timely regulation or removal of the latter, substantially as herein set forth.

43,293.—Horse-shoe.—George Custer, Monroe, Mich.:

I claim a horse shoe constructed in the specific manner herein represented and described.

43,294.—Stop-motion for Knitting Machines.—Joseph Dalton, Brooklyn, N. Y.:

I claim furnishing the bobbin of a knitting machine with a movable piece, b, applied to operate substantially as herein described, for the purpose of unlocking the stop motion when the yarn gives out.

43,295.—Boot and Shoe.—George W. Day, Charlestown, Mass.:

I claim, as a new article of manufacture, a boot or shoe, having a construction substantially as specified.

43,296.—Safe.—Thomas Dolan, Albany, N. Y.:

I claim the casting of the shell of a fire-proof safe door with an off set or chamber, A, to receive the lock, C, substantially as and for the purpose herein set forth.

43,297.—Window-sash Fastening.—John P, Ellis, Flushing, N, Y.:

I claim the combination of the hinged plate, F, and slide, G, with the spring catch, B, substantially in the manner herein shown and described.

I also claim the combination of the plates, F, and slides, G, one or more of each, with the frame, E, all constructed and operating substantially in the manner herein shown and described.

I further claim the employment of a yielding holding surface, F, or its equivalent, with the holding catch, B, substantially in the manner herein shown and described.

[This is an improved spring sash-fastener by which the window may be set and locked in any desired position, without the need of employing the hand to press or operate a spring bolt. Both hands are thus at liberty to move the window, which may be said to lock itself. The superior convenience of the improvement must be obvious.]

43,298.—Gun Carriage.—John Ericsson, New York City:

I claim, first, Providing for the working of a gun carriage by securing two of its trucks firmly to a revolving axle, and combining the said axle with a system of toothed gearing attached to the carriage, substantially as herein specified.

Second, The employment for producing the friction necessary to check the recoil of a gun carriage, or hold it securely in any position, of a system of metal plates and a system of interposed timbers, the one attached to the carriage and the other to the bed or platform upon which it works, substantially as herein-described.

Third, The compresser composed of two levers, M M', and a screw shaft, P, with collars, Q k, and a nut, N, applied and operating in combination with the check plates, K K, and friction timbers, L L, substantially as herein specified.

[The object of this invention is to enable a heavy gun to be worked by few hands, and to reduce the recoil in such degree as to permit the gun to be worked in a turret or within a limited space.]

43,299.—Apparatus for exhibiting Photographs.—Wm. Henry Fay, Chester, Mass.:

I claim, first, The cover, D, having one or more openings, I, in combination with the rotary picture-holder, C, when they serve to

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form the whole or a part of the top of a table or other similar article of furniture, substantially in the manner and for the purpose herein set forth.

Second, The combination of cover, D, rotary picture-holder, C, stationary spring, F, and spring slide, G, substantially in the manner and for the purpose described.

43,300.—Saddle Stirrup.—John Fichter, Newark, N. J.:

I claim a saddle stirrup combined with a hood and legging, in the manner substantially as herein shown and described, so that the stirrup may be used separately as an ordinary riding stirrup, or converted into a military and Mexican stirrup, as set forth.

[This invention consists in constructing the stirrup in such a manner that it may, with the greatest facility, be converted into a military, Mexican, or ordinary stirrup, as required, and still possess, when adjusted in any one of the forms specified, advantages over the several kinds of stirrups especially constructed for these several purposes.]

43,301.—Steam Boiler.—L. B. Flanders, Philadelphia, Pa.:

I claim, first, The deflectors, I, arranged in respect to the inner tubular casing of the boilers, substantially as and for the purpose set forth.

Second, The plate, f, arranged in respect to the deflectors, I, the tubular casing, and exit opening, y, as and for the purpose described.

43,302.—Brace or Bit Stock.—D. P. Foster, Shelburne Falls, Mass.:

I claim, first, Making the stem or body of a brace of a tube, substantially as shown.

Second, I claim securing the bit to the brace by means of the cap, o, chuck, F, and nut, G, as shown and described.

43,303.—Lantern.—Henry A. Fox, Cincinnati, Ohio:

I claim, first, The provision in a lantern of the formed or curbed base, A B, adapted to catch and retain the waste oil and prevent spilling, as herein explained.

Second, The curbed base, A B, in the described combination with the detachable reservoir, F G.

43,304.—Quartz-crusher.—David Gay & John H. Purkiss, Long Bar, Cal.:

We claim the attachment of the water wheel to the side of the crushing wheel, substantially in the manner herein shown and described, so that the water wheel will drive and travel with the crusher wheel, all as set forth.

We also claim the combination with the water wheels of the water conducting aprons, substantially as herein shown and described.

43,305.—Lubricator.—Thomas W. Godwin, Portsmouth, Va.:

I claim, first, The double-valved piston, E, in combination with the tube or cylinder, C C.

Second, The manner of supplying the reservoir, A, with the lubricating oil by the action of the piston, F, in combination with the cylinder, C C, and the orifices, E E E, as set forth and described.

43,306.—Breech-loading Ordnance.—Wm. F. Goodwin, Powhatan, Ohio:

I claim, first, In combination with the lugs or projections, B B, having bearing surfaces perpendicular or nearly so to the axis of the bore, the solid oblong breech block, C, having flanges, c5, concentric with the axis, and otherwise constructed and applied as herein shown and described, so that by turning the block after its insertion its ends will occupy the concavities of the lugs, B B, and the entire strength of the block will be employed to resist the explosion.

Second, I claim the combination of the slotted shank, C′, and slotted sleeve, D′, of the hinged arm, D, adapted in the manner described to permit the ready insertion of the primers.

Third, In combination with the shank, C′, of the block, C, I claim the screw cap, C, and for facilitating the removal of the burnt primers, as explained.

[This invention relates to a swinging yoke or breech-piece of novel and improved construction, and to a gun so formed as to adapt a swinging yoke or breech-piece, formed in one piece, to be applied and secured without employing trunnions, as a means of attachment. Also to a breech plug of peculiar construction and to novel devices for adapting the same to be more readily inserted or removed.]

43,307.—Machine for loading Hay.—James T. Hall & Isaac Pierce, Holland Patent, N. Y.:

We claim, first, The hinged bars, I, constructed as described, and provided with the tines, T, in combination with the tines, T, in combination with the spring dog, S, arranged and operating as and for the purpose shown and described.

Second, The clearing rods, O, arranged as shown and described, and operating in combination with the hay elevating devices, in the manner and for the purpase specified.

43,308.—Bridle.—Samuel B. Hartman, Millersville, Pa.:

I claim the application of the strap, C, to common bridles, in the manner and for the purpose specified.

43,309.—Tack-hammer and Carpet-stretcher.—Alonzo Hicks, Factoryville, N. Y.:

I claim the combined tack-hammer and carpet-stretcher, made as specified.

43,310.—Cement-pipe Machine.—E. T. Jewett, St. Albans Bay, Vt.:

I claim the bevelled-faced jaws, A A′, when constructed and operated in the manner specified.

I also claim the combination of the jaws, A A′, with th rods, I, tozzles, J, and levers, K K, substantially as herein shown and described.

I also claim the combination of the horizontally moving mandrel, B, with the jaws A A′, substantially in the manner and for the purpose herein shown and described.

I also claim the combination of the toggle and lever, F, with the mandrel, B, substantially as herein shown and described.

[We cannot well convey a fair idea of this machine without an engraving. Suffice to say, that it is apparently a very effective device for the purpose of making all kinds of pipes, of clay, cement, or other plaster material, can be easily constructed, and conveniently operated.]

43,311.—Lathe Attachment for turning Tapers on Bars.—C. Jillson, Worcester, Mass.:

I claim, first, The combination of the stock, A, tool-holder, B, eye, h, and cutters or chisels, d, operating together as and for the purpose described.

Second, I also claim in combination with the stock and with the tool-holder, the buttons, k l, for allowing the latter to be moved in the former by a gage or pattern, substantially as described.

Third, I also claim in combination with a revolving shank or spindle, a head stock attached thereto, but not turning with it, and a pattern or guide upon said head-stock for the purpose of controlling the chisels or cutters and defining their working distance from the center of the article being tapered, substantially as described.

43,312.—Lantern.—Charles Jones, Brooklyn, N. Y.:

I ccaim the arrangement and combination of the two pieces of sheet metal, a and b, bent and secured together as described to form the top and rim of a four-sided lantern, including the draft protectors, substantially as described.

The pyramidal lantern body or chimney made of separate panes of glass fitted to each other and framed together by the top and bottom rims and the guards and without corner sash-bars, substantially as described.

The hooked ends of the guards In combination with the top rim and panes of glass, substantially as described.

In combination with the base or bottom rim of the lantern the step or rebate on the edges of the lamp, substantially as described.

43,313.—Heat Regulator.—Smith M. Kellogg, Battle Creek, Mich.:

I claim the dampers, e e, having supporting edges, i i, thereon, in combination with the pipe, b, provided with the shoulders, i′ i′, outer pipe, a, and damper, d, the whole operating substantially in the manner and for the purpose set forth.

43,314.—Stove.—W. B. Kimball, Peterboro', N. H.:

I claim a stove composed of soap-stone panels set in metal frames and recessed at bottom as herein described, to receive the ashes and cause the lower edges of the stone to be exposed to as intense heat as the center part.

[This invention consists in constructing the stove with an iron or metal frame filled in or provided with stone panels, and having the stove provided with sliding doors also constructed of iron frames filled in with stone. The invention is designed for a combined open and close stove and to burn either wood or coal.]

43,315.—Scaffolding, and elevating the same.—Philetus Knapp, Woodford, Vt.:

I claim, first, The combination of the upper slide, platform and lower slide, with their attachments and connections for moving or holding on the shaft or mast, substantially as herein described.

Second, I also claim the attaching and detaching of the sections of the shaft or mast, in combination with the upper and lower slides as herein described and represented.

Third, I also claim in combination with the platform and its slide, the letting out and taking up of the guys by mechanical means, substantially such as herein described and represented.

43,316.—Car Spring.—George H. Lewis, Providence, R. I.:

I claim the improvement in the manufacture of car and other springs, which consists in forming a hollow air-tight elastic vessel or shell the sides or walls of which are of sufficient thickness to be practically non-collapsible in combination with partially or wholly filling said vessel with any suitable liquid so as to add to the resisting power of the spring, as set forth.

43,317.—Folding Car Standard.—S. Little, Loretta, Pa.:

I claim the combination of the slot in the standard, and the recess below the standard, with the pivot pin, so that the standard may be raised and lowered in a vertical line as well as swing on the pivot pin, substantially in the manner and for the purpose herein described.

43,318.—Grain Separator.—Leonard Low, San Francisco, Cal.:

I claim, first, The arrangement of the inclined screens, I, in quadrent sets, around a center shaft, B, substantially as herein described and shown.

Second, The combination of the screens, I, and chutes, K, when the same are arranged around a center shaft and operated by oscillatory motion, substantially in the manner and for the purposes described.

Third, The adjustable strips, E, in combination with the screen supporters for the purpose of adjusting the inclination of the screens, substantially as described.

Fourth, The hopper, L, in combination with the telescopic nozzle, N, and crop-head, U, for the purpose of adjusting the feed of the grain, substantially as herein described.

43,319.—Cannon Sight.—Philo Maltby, Cleveland, Ohio:

I claim, first, The combination of the rotary rear sight with the rotary forward sight, each being constructed in pairs and numbered as described and used in connection with each other, as and in the manner herein set forth.

Second, I claim the herein described method of holding the rear and forward sights in place when adjusted to corresponding numbers, as described.

Third, I claim in combination the standard, A, cross-piece, B, and rear-sight, E, arranged and operated as herein set forth.

Fourth, I claim the horizontal adjustment of the sight, E, by means of the screen, C, and holding the same in position by means of the gib, a, and thumb-screw, d, as specified.

Fifth, I claim a series of rotating rear and forward sights, when constructed and operating as herein described, the same being adapted to different degrees of light.

Sixth, I claim the cap, G′, and the herein-described method of attaching it to the cascable of the gun, substantially as described.

Seventh, I claim the vertical adjustment of the rear sight by means of the bar, G′, and set screw, e, when arranged and operating as and for the purpose specified.

43,320.—Steam Boiler.—George Mann, Jr., Ottawa, Ill.:

I claim the pipe open at each end and attached to the front part of the steam boiler and connected with the water gages of the boiler, as shown in the above specification.

43,321.—Mammiform Breast Protector.—Eleanor M. Marshall, Hillsdale, N. Y.:

I claim, first, Making the springs, A A2, mammi-form, for the purposes herein specified.

Second, I claim forming the springs, A A2, from one and the same piece of wire, for the purpose shown.

43,322.—Construction and Equipment of Ships of War.—R. G. McDougall, New York City:

I claim, first, The removable cutting edges, c c, applied to a beak or prow of any suitable form.

Second, The well or stand pipe, D, closed by an adjustable valve, d, in combination with the vessel, A, constructed and operating substantially as and for the purpose shown and described.

Third, In combination with the aforesaid well, D, I claim the separate hawse pipe, E, extending down through the bottom of the vessel and operating in combination with the chain, f, in the manner and for the purpose substantially as described.

Fourth, Forming the after part of the vessel with double ogee lines, g h, in combination with screws and rudders, arranged substantially as and for the purposes set forth.

Fifth, In a vessel constructed substantially as herein described, the open net work skegs, j, and fore and aft braces, m, applied to the vessel, A, substantially in the manner herein described, to form counter braces, and to receive and protect the screws and rudders, and at the same time give free access of water to the screws and rudders.

Sixth, In a vessel constructed substantially as herein described, connecting the chains or ropes of two or more rudders upon one central drum, O, substantially as and for the purpose specified.

Seventh, Connecting the steering gear with the throttle valve of the engines, in the manner and for the purposes herein specified.

Eighth, The use of two or more turn-tables, I, with guns, J, in combination with an oblong cylindrical casemate, G, constructed and operating substantially as and for the purpose set forth.

Ninth, The oblong cylindrical casemate, G, with arched roof, H, and radiating ports, K, constructed, arranged, and operating as and for the purpose specified.

Tenth, In a vessel constructed substantially as herein described the double sliding doors, L, in combination with converging spring levers, M, applied substantially as and for the purpose described.

Eleventh, The removable top, g, of the pilot-house, F, raised and lowered, substantially as herein described for purposes of ventilation and protection.

43,323.—Apparatus for forming Stereotype Molds.—J. D. McLean, New York City:

I claim, first, The employment or use of a sliding frame, E, provided with type dies, H, in connection with parallel plates, B B, a notched bar, G, and a rod, F, provided with an upright, k, all arranged as shown for the purpose of adjusting the type dies over the plastic substance which receives the impressions, for the purpose set forth.

Second, The plunger, D, in combination with the die frame, E, grooves, f f, in the plates, B B, and slides, M M, in said grooves, for the purpose specified.

Third, The pawls, K K, connected with the levers, L L, with the springs, q s, attached, in connection with the racks, J J, on the bed, I, for the purpose specified.

Fourth, The pawl, Q, and screw, R, in combination with the pawl, P, at the under side of the platform, O, for the purpose set forth.

[The object of this invention is to obtain a machine of simple construction by which molds or matrixes for producing stereotype or electrotype plates for letter-press printing may be formed direct from dies, thereby avoiding the labor and expense of setting up type, and the casting or forming of molds therefrom.]

43,324.—Nail Machine.—Michael McManus, Brooklyn, N. Y.:

I claim, first, The combination with the lever, H h, and the cutter, E, of the sliding lifter, F, slotted arm, c, and crank, d, whereby the cutter is thrown into and out of gear at the will of the operator.

Second, The friction brake, R, and belt-tightening lever, O, combined with each other and with the hammering or shaping mechanism of a forging machine, which has its cutting mechanism driven independently, substantially as herein specified.

Third, The gage, T n n′ p, combined with clamp, g, of the rod holder, substantially as and for the purpose herein specified.

43,325.—Mode of purifying Hydro-carbon Oils.—Joshua Merrill, Boston, Mass.:

I claim in the precess of purifying hydro-carbon oils, treating them substantially as hereinbefore described, with sulphate of soda, for the purposes substantially as hereinbefore set forth.

Also in combination with the treatment by sulphate of soda, I claim in said process the use of caustic or carbonate alkalies, substantially as described.

43,326.—Can for Paint, Fruit, etc.—Herman Miller, Hoboken, N. J.:

I claim having the plates provided with solder grooves, b, in combination with the turning of the edges of the plates into said solder grooves, substantially in the manner and for the purpose herein shown and described.

[In this improvement the joining edges of the can are bent in a peculiar manner, so as to lock firmly together; and there is also a groove made in the body of the tin, along the line of the lapping edges. This groove strengthens the can and also serves to assist the workman in soldering, by keeping the solder upon the lap, preventing it from running away, etc. Liability to leakage is thus prevented, the operation of soldering is cheapened and quickened, and the finished can is stronger, and in many respects superior to those made in the ordinary manner. We consider this a good improvement.]

43,327.—Hand Spinning Machine.—Charles A. Moorehead, Quincey, Ill.:

I claim, first, Elevating the spindle for reeling off the yarn or for other purposes by causing the spindle frame, A, to revolve upon its carriage without disconnecting the spinning apparatus, substantially as described.

Second, Making the journal boxes of the spindle removable, in order to withdraw the spindle from its frame and thereby be able to cross the driving band, substantially as described.

43,328.—Stove.—Benjamin Morison, Philadelphia, Pa.:

I claim, first, The stationary bottom grate, D, and the vertically-sliding front grate, E, when the same are constructed and arranged together in combination with the fire-box of a stove, so as to operate substantially in the manner described and set forth for the purposes specified.

Second, I claim extending the grate bars of the front portion of a stove grate so that the said extensions or their equivalents shall form ribs, e5, exclusively on the inner or fire side of the thin upper portion, e4, of the same, substantially as described and set forth for the purpose specified.

Third, I also claim the mode herein described and set forth, of constructing and securing the lining of the fire-box of a stove; the same consisting of the two side pieces, c c, each sloped and rabbeted as described, and the single back-piece, c′, having its two ends sloped to fit in the said rabbets of the side pieces as described, the front ends of the said side pieces being retained in position by means of the vertical ribs, 2 2, or their equivalents, substantially as described.

43,329.—Sea Pipe for Vessels.—David W. Nearns, St. Louis, Mo.:

I claim, first, The arrangement and combination of the nuts, C E, and pipe, A, in the formation of the joints of shoes or sea pipes with the sides of vessels, substantially as herein set forth and represented.

Second, I claim the employment of the perforated tube or pipe, g, in combination with the pipe, A, substantially as and for the purposes set forth.

43,330.—Mounting Heavy Guns.—John B. Newman, Milford, Pa.:

I claim, first, The yokes, F F′, supported on wheels substantially as described and employed for elevating and mounting guns, as set forth.

Second, I claim the pins, f, in combination with the apertures, f′, for adapting the yokes to convey the gun in either a direct or indirect course, in the manner specified.

Third, I claim the lever, H h h′ h′, constructed in the manner described and having its fulcrum in the lever, I, when employed in combination with a rack, g, formed on the face of the wheel, G, as and for the purpose set forth.

Fourth, I claim the angular blocks or pieces, f2, applied to the yokes, F F′, in the manner and for the purpose explained.

Fifth, I claim the ways, E, inclined in relation to the chassis, A, substantially as and for the purpose explaiped.

43,331.—Harvesting Machine.—Samuel K. Paden, Volant, Pa.:

I claim, first, The combination of the chain, chain-wheels, pinions, and curved segments for raising or lowering and holding the cutting apparatus at any adjusted hight, substantially as described.

Second, I also claim in connection with the raising and lowering mechanism the shaft, P, its pinion, Q, and the two racks, v w, for taking up or letting out the reel driving belt, S, to keep its tension on the pullies uniform, substantially as described.

I also claim, in combination with the double-hinged joints, n o, between the platform and main frame, the coupling, p, and bridge, X, for the purpose of conveying the grain from the platform to the main frame by a belt, substantially as described.

43,332.—Mode of attaching Door Knobs to their Spindles.—Emery Parker, West Meriden, Conn.:

I claim the employment of a slitted washer, D, in combining the knob with a threaded spindle, by means of an independent piece of metal which embraces the spindle at its square portion, and engages with the end of the shank of the knob, substantially in the manner and for the purpose set forth herein.

43,333.—Mule for spinning Woolen Yarn.—Seth D. Paul, Lawrence, Mass.:

I claim as an improvement in the roller motion the use or combination of roller cam, 27, latch, 28, latch spring, 29, lever, 30, the connecting gears, and worm gears, spring, 37, levers, 36 and 38, and stand, 40, or their equivalents operating substantially as described.

Second, I claim the apparatus for running the carriage in, while twisting, consisting of the combination of pinion, 8, gears, 9, 9, 10, swing shaft, 11, gears, 12, 13, scroll, 14, plate, 17, cams, 18, 18, gears and pinions, 19, 20, 21, lever, 23, spring, 24, and joint, c, or their equivalents, substantially as described.

Third, I claim the combination of lever, 41, spring, 42, spring, 43, and arm, 67, or their equivalents, for throwing up the winding-on ratchet from the gear and allowing the mule to back off.

Fourth, I claim the shipper, 47, running the whole length of the mule, and also at right angles across the length of the mule head, substantially as described.

Fifth, I claim the attachment, 49, to shipper, 47, with its joint and spring, 54, operating substantially as described.

Sixth, I claim the combination of the spring latch, 44, with the backing off, relieving lever, substantially as described.

Seventh, I claim the shapers, 50, 50, as described and for the purpose specified.

Eighth, I claim the shapers, 51 51, as described and for the purpose specified,

Ninth, I claim the combination of the scroll, 14, 14, or its equivalent, with the roller cam, latch and spring, which govern the motion of the rollers.

43,334.—Cut-off Valve.—Charles H. Parshall, Detroit, Mich.:

I claim, first, The plate, V, constructed, arranged and used for the purposes and substantially as herein shown and described.

Second, The balanced cut-off valve, G E, constructed and operating substantially as described.

Third, The aperture, D, in center of valve and over exhaust-port, S, constructed, arranged and used, in combination with the cut-off valve, G E, for the purposes and substantially as herein shown and described.

Fourth, The plate, V, plate, E, aperture, D, and cut-off, G, in combination, all constructed, arranged and used for the purposes and substantially as shown and described.

43,335.—Seed and Grain Drill.—W. P. Penn, Bellville, Ill.:

I claim setting the feeders, F, at an oblique angle with the axis of the rock-shaft, E, combined with the hopper box, for the purpose of insuring a more uniform flow of seed, as set forth.

43,336.—Device for oiling Wool in Carding and other Machines.—W. K. Platt, Gloucester, N. J., and Henry Holcroft, Media, Pa.:

I claim, first, The oil tank or cistern, K, rotary oiling cylinder, G G, and rotary brush, F, in combination with each other and with the roller, E, and feed apron, C, to operate substantially as and for the purpose herein specified.

Second, The rotary oiling cylinder having pivoted slats, e e, operating in combination with stops, g g, substantially as and for the purpose herein specified.

Third, The apron or burr carrier, I, applied and operating substantially as and for the purpose herein specified.

[The object of the first part of this invention is to oil the wool on its way to the carding engine, burring machines or picker. This part of

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the invention consists in the combination with the feed apron of such machine, of an oiling cylinder rotating in a tank or cistern containing oil or oiling mixture, and a rotary brush which receives the oil from the cylinder and oils the surface of a fluted roller under and in contact with which the wool passes on its way from the apron to the feed rollers of the machine. The wool, in passing under and in contact with the above-mentioned fluted roller, receives from it the necessary quantity of oil. Another part of this invention consists in an improved device for carrying away the burrs from such machines.]

43,337.—Car Wheel.—Perley Putnam, Laconia, N. H. :

I claim a cast-iron car wheel having a double plate or two plates with corrugated surfaces or alternate projections and depressions extending around the central opening of the wheel, substantially as shown and described.

I also claim the V-shaped arms or projections on the serpentine portion of the wheel, and extending along underneath the flange thereof, as set forth.

I further claim the corrugated double plates, c c, serpentine portion, d, and arms, h, all combined and arranged to form a new and improved cast-iron car wheel, as described.

[This invention consists in casting the wheel with a corrugated double plate around its center and having the flange side of the wheel cast with V-shaped arms or projections which extend from the corrugations around the center of the wheel outward and underneath the flange of the wheel, whereby a very strong and durable cast-iron car wheel is obtained.]

43,338.—Let-off Motion of Power Looms.—Rensselaer Reynolds, Stockport, N. Y.:

I claim, first, The brake, F, combined with the yarn beam by means of a brake wheel, E, a rigid lever arm, G, and a pivoted stem, d, to which is attached a weight, H, and arm, e, the whole applied to operate substantially as and for the purpose herein described.

Second, The combination of the brake with the vibrating bar, K, or whip roll, by means of a lever a m, I I, attached to the brake, and a lever, J attached to or forming part of the vibrating frame which carries the said bar, K, or roll, substantially as herein set forth.

Third, The hand lever, L, applied and arranged in combination with the brake shoe, substantially as and for the purpose herein specified.

[This invention relates to let-off motions of what are termed the "friction" kind in contradistinction to those which have a positive action.]

43,339.—Loading Ordnance.—Delos E. Rice, Detroit, Mich.

I claim the combination of the cogged piston rod, D, pinion, E, crank, F, tight piston, A A, annular cartridge, C, and hook and eye attachment, H, all constructed, arranged and operating as set forth.

43,340.—Leather-paper for Floor Cloths, etc.—Edward Richmond, Brookline, Mass.

I claim, as a new article of manufacture, a carpet, rug, lining, table cover, house or wall paper made of two or more sheets of leather paper united at their edges, in the manner hereinbefore described, so as to produce a continuous even surfaced sheet, substantially as set forth.

43,341.—Vegetable Ointment or Salve.—Wm. C. & James H, Roney, Gallupville, N. Y.

We claim the combination of the various ingredients above specified to produce a vegetable ointment and sticking salve, substantially and for the purposes specified.

43,342.—Beer-cooler.—Daniel Sager, Albany, N. Y.

I claim, first, The reservoir, B, provided with the tubes, C and D, when used in combination with the tub or box, A, substantially as shown and described.

Second, I claim providing the exhaust pipe with the outlet, e, in combination with the stop cocks, a and b, substantially and for the purpose herein set forth.

Third, I claim providing the reservoir, B, with the tube, F, having a cock, d, for the introduction of water, or other liquids, as described.

Fourth, I claim supporting the reservoir by means of the legs, f, or their equivalents, substantially as and for the purpose set forth.

43,343.—Tightening Tires of Carriage Wheels.—Peleg S. Sanford, Westport, Mass. :

I claim tightening the tires of carriage wheels by separating the fellies with keys, as set forth and described.

43,344. — Sirup Gage for Bottling Soda, etc. — Jno. Schrink, Toledo, Ohio :

I claim the chambers, A' A'', induction pipe, H', eduction pipe, L, sirup pipe, B, valve, J, and piston, D, these several parts being constructed, arranged, and operating substantially as and for the purpose herein set forth.

43,345. — Oil Can.—Eliphalet S. Scripture, Brooklyn, N. Y. :

I claim the use or employment of the thumb piece, B, in combination with the flexible bottom, A, spiral spring, S', and can, P, when the same shall be combined for the purposes herein set forth.

43,346. Tanning.—Harris Stratton, Jr., Leavenworth, Kansas :

First, I claim a tanning compound constituted of terra japonica, Sicilian or native sumac, sulphate of soda, nitrate of potassa, and bois de arc, or bow-wood bark, the whole being combined and employed in the manner herein specified.

Second, I claim the combination of sulphate of soda and lime, employed in the manner described, for softening the hides preparatory to tanning.

43,347.—Artificial Teeth.—John Terrell, Philadelphia, Pa. :

I claim, first, The openings, e and i, formed and arranged in respect to a tooth or a block of teeth, substantially as and for the purpose specified.

Second, The projections, a, arranged as described for the purpose set forth.

43,348. — Manufacture of Alcoholic Spirits. — Macklot Thompson, St. Louis, Mo. :

I claim, first, The general disposition of macerating tubs and method of working the same, so that the liquid is caused to descend by its own gravity from one tub to another, and in its descent become charged with saccharine matter, being discharged at intermediate points only when the wort shall have acquired the requisite degree of density.

Second, The method of working macerating tubs in batteries arranged in cascade fashion, and connecting said batteries so that the work of one may be continued into the other.

Third, The method of working the macerating tubs of each battery at the temperatures of 212° and 150° Fah., respectively, at the periods and in the manner hereinbefore set forth.

43,349.—Printing Press.—Stephen D. Tucker, New York City :

I claim the employment of the means, or the equivalent thereof, for discharging a current or currents of air under the sheet of paper, to hold it up against the under side of a series of tapes or cords, in combination with the fly for depressing or striking down the sheet, substantially as described.

43,350.—Printing Press.—Stephen D. Tucker, New York City :

I claim hanging the frame which carries the roller which transfers the ink from the inking cylinder to the ink distributing surface of the type cylinder, so that it shall vibrate on the axis of the inking cylinder, substantially as and for the purpose described.

I also claim the manner of adjusting the pressure and range of motion of the roller which transfers the ink from the fountain roller to the inking cylinder and the roller which transfers it from the inking cylinder to the ink distributing surface of the type cylinder, or either of the said rollers, by the employment of the adjusting shaft with its eccentric pin, or the equivalent thereof, in combination with the swinging frame which carries the roller and vibrated in one direction and against the eccentric pin by a spring, or the equivalent thereof, as and for the purpose specified.

And I aslo claim, in combination with the radial bars of the rollers for inking the form of types, the shafts, with their weighted levers, or the equivalent thereof, for drawing the said rollers a short distance from the ink distributing surface of the type cylinder for the purpose set forth, and so that the rollers shall be restored to their operating condition when the form of types reaches them, as set forth.

43,351. — Breech-loading Ordnance. — Thomas Tully, Waukegan, Ill. :

I claim the construction and combination of the arms, C, and eccentric ring, D, arranged and combined with the swinging breech, B, as herein described, for the purpose of expediting the loading of a cannon, and preventing the escape of gas.

43,352.—Treating Lard, Tallow, etc.—George B. Turrell, New York City :

I claim the method herein specified of treating lard or other fatty material, for the removal of aqueous and volatile portions, and I also claim the cooling of such materials, in substantially the manner and for the purpose specified.

43,353.—Switching Car Trucks.—Joseph E. Tynan, Paterson, N. J. :

I claim the lever, A, or its equivalent, as shown and described, when applied to city rail way car trucks, for the purpose of switching such cars from a straight track around curves or on to other tracks or sidings.

43,354.—Fruit-drier.—William Voegel, Chelsea, Mich. :

I claim the combination of the stove, B, flue, F, guard plate, I, sliding shelves, D, D, D, door, C, and hot air passages, j, h, c, d, when constructed, arranged, and operating in the manner and for the purposes herein specified.

[This invention consists in arranging, in a novel way, a series of shelves or drawers within a case containing a stove or heater, and having the latter covered by a plate, and the case provided with a ventilator; all being arranged in such a manner that the heat is made to pass all around the shelves and drawers, and upward through the centres of the same, whereby the fruit may be dried very expeditiously and in a perfect manner, and with but very little labor and trouble on the part of the attendant.

43,355.—Braid Guide for Sewing Machines.—Jeptha A. Wagener, New York City :

I claim providing for the passage of the braiding material over a bridge, b, and through a channel, d, d, which is below the top surface of the slotted portion of the braider foot or pad, a, substantially in the manner and for the purpose described.

Second, So constructing the slotted portion of the braider foot or pad, a, with a depressed bridge, b, and a groove or slot, d, d, in a plane above the bridge, and an intersecting or needle slot, c, that the braid can be passed under the foot or pad, and over the bar or bridge, in a straight, or nearly straight, line, and also be sewed upon the cloth through the top of the foot or pad, and inspected before it passes from under the foot or pad, all in the manner set forth.

Third, I claim the combination of the depressed bridge, b, slot, d, d, and pressure foot, a, the whole constructed, arranged, and operating in the manner substantially as described.

43,356.—Punch for cutting out Welts of Boots and Shoes.—J. H. Walker, Worcester, Mass. :

I claim, first, In combination with a spiral or volute knife or cutter, set and held in a stock of wood, a metallic or other resisting back or base, to prevent the cutter from being driven into the wood, by use or otherwise, beyond a given distance, substantially as, and for the purpose described.

I also claim, in combination with a volute or spiral cutter for cutting out straps or strips of leather, a cross knife or knives for separating said strip in part or in whole from the refuse, substantially as described.

I also claim, in combination with a spiral or volute knife, and a cross knife or knives, an ejector for throwing out the end of the cut strap, as and for the purpose described.

43,357. — Construction of Piles for Wharves, etc. — Chauncey Walton, Washington, D. C. :

I claim, first, Surrounding the wooden pile with a metallic ferrule at the water line, to preserve the wood, by keeping it in a uniform hygrometric condition.

Second, Making the pile of two or more short pieces of timber, substantially in the manner and for the purpose described.

43,358. — Machines for cutting Matches. — Anthony Welsch, Chicago, Ill. :

First, I claim the combination and arrangement of a series of cutting grooves, a, with a corresponding series of flexible spring cutters, c, c, whether said cutters are arranged alternately, as shown, or not, operating substantially as and for the purposes herein described and shown.

Second, I claim arranging the spring cutters, c, c, alternately, in two rows, substantially in the manner and for the purposes specified.

43,359.—Tool for graining Marble, etc.—Stephen Wiggins, Bridgeport, Conn. :

I claim the combination of the elastic type cylinder, A, clearing roller, B, clamp, C, center pins, D, springs, E, E, and handle, F the whole being constructed, arranged, and employed in the manner and for the purpose set forth.

43,360.—Bench Plane.—Stephen Williams, Philadelphia, Pa. :

I claim, first, The construction of the body of the plane of moveable blocks or sections, substantially in the manner and for the purpose herein shown and described.

Second, I claim the combination of the moveable sections, D, D, independent plane bit holder, A, enclosing band, E, and screw, F, all arranged and employed as described.

43,362. — Harvester. — Charles P. Wing, Fayetteville, N. Y.

First, I claim the bar or lever, F, in combination with the arm, G, and pins, g, for elevating and lowering the cutting apparatus, or retaining it in a fixed elevated position, or at any desired angle, substantially in the manner and for the purpose explained.

Second, In combination with the above, I claim the traction wheel, A, formed with a convex rim or periphery, for the purpose of presenting an effectual traction surface when the cutting apparatus is elevated, as set forth.

Third, I claim the vibratory beam, B, employed in connection with the pole or tongue, C, in the manner described, so as to preserve the proper position of the raker's seat, H, driver's seat, L, reel standard, M, and whiffletree, S, when the cutting apparatus is elevated by the bar, F, as set forth.

43,369.—Steam Engine.—Wm Wright, New York City:

I claim, first, The arrangement of a steam engine for marine and other purposes, the steam chamber or cylinder of which is stationary and curved into a segment of a circle concentric with the center of motion, the said chamber or cylinder being of a circular sectional area, substantially as herein set forth.

Second, In combination with a segmental steam cylinder or chamber, I claim the piston rod traversing both ends of the said cylinder or chamber and forming an open ring the center of which is the center of motion, substantially as set forth.

Third, I claim the combination with a stationary segmental steam cylinder piston and annular piston rod of a walking beam hung and oscillating in bearings at the center common to the cylinder and piston rod, substantially as set forth.

Fourth, In combination with a stationary segmental steam cylinder and piston and annular piston rod, I claim an oscillating walking beam rigidly connected and moving in unison with the piston rod, substantially as set forth.

Fifth, The combination of an annular piston rod extending through both ends of a segmental steam cylinder with a walking beam rigidly connected at both of its ends with the piston rod, substantially as set forth.

Sixth, The attachment of a connecting rod to both the beam and piston rod when the movement of the latter is thus transmitted directly to a revolving shaft, substantially as set forth.

Seventh, The arrangement of a segmental engine substantially as described whereby two connecting rods may be used operating two different shafts on either side thereof for the perfect balancing of, and for obtaining the greatest useful effect from the engine, substantially as set forth.

Eight, In combination with a piston rod whose transverse section is more or less oval or elongated, I claim the method herein described of packing the same by the employment, in connection with a suitable stuffing material, of side compression plates, substantially as set forth.

43,363.—De-sulphurizing Ores.—Hezekiah Bradford (assignor to Horatio Bogart), New York City :

I claim, first, Moving the metallic ores gradually from the cooler to the hotter portions of a hearth substantially as specified, so that the de-sulphurizing operation is gradually performed as set forth.

Second, I claim the introduction of steam or of steam and hot air combined, into a chamber over a hearth on which the ore is gradually heated, substantially as and for the purposes specified.

Third, I claim a series of stirrers moved by a chain, in combination with the de-sulphurizing hearth, for the purposes set forth.

Fourth, I claim the flap, l l, in combination with the stirrers and de-sulphurizing hearth, for allowing the stirrers to enter and leave the chamber as specified.

Fifth, I claim the water vessel, m, to cool the chains and stirrers as set forth.

Sixth, I claim the arrangement of the circulating pipes, u r and s, and vessels, o and p, in combination with the boiler, q, for the purposes set forth.

43,364.—Boring Machine.—Joseph Edgecomb (assignor to Thomas H. Dodge), Worcester, Mass.:

I claim the combination of the stops, M, with the device for automatically throwing into action, the rack bar, K, and gear, I, after the auger has made one or more revolutions to break the thread in the wood, substantially as and for the purpose herein described.

I also claim the combination of the screw, m, cam, n, and dog, o, with the spring rod, L, for the purpose of throwing the rack bar in and out of of gear from the wheel, I, substantially in the manner herein described.

I also claim in combination with the rod, L, the spiral spring, v, for the two fold purpose of forcing said rod upwards and of imparting to it a tendency to turn so as to force the dog, o, to its original position after it has been acted upon by screw, m, substantially as herein described.

I also claim, in combination with the stop, M, the set screw, p, and point, 6, when applied to boring machines, substantially as herein described.

I also claim the combination of the auger shaft, G, bevel wheels, F H, wheel, I, screw, m, cam, n, rack bar, K, spring, L, with the several devices for operating them, substantially as and for the purposes set forth.

43,365.—Saw Mill.—C. T. Fairchild (assignor to Wm. A. Veer), Salisbury, N. Y.:

I claim, first, The rail, B, bearing on the log from end to end in combination with the arms, a, toothed racks, c, pinions, d, arbors, e, and hand lever, f, constructed and operating substantially as and for the purpose specified.

Second, The index, i, adjustable by means of the slotted hinge, j, in combination with the hand lever, f, spring catch, g, and gage, B, constructed and operating in the manner and for the purpose specified.

[This invention relates to certain improvements in gages for circular and other saws whereby after each cut the log can be readily moved the desired distance for another cut and the thickness of the boards can be determined without loss of time.]

43,366.—Folding Arm-chair.—Henry S. Golightly and Chas. S. Twitchell (assignor to Jas. G. English and E. F. Merrick), New Haven, Conn.:

We claim, first, The construction of a folding arm-chair by combining with the legs, arms, and back, when jointed together so as to admit of their being folded as herein described of a seat made of rigid material or of a flexible fabric or substance when secured in or stretched upon a rigid frame, substantially as set forth.

Second, In folding arm-chairs in which the several parts are united by and movable upon fixed joints, we claim a non-flexible seat hinged to the front rail which is the hinge bar common to the arms and front legs, substantially as set forth.

Third, Locating the joints of the standards and the cross legs at the point below the seat and out of the line and back of the rear legs so that when folded the upper part of the legs will laterally overlap each other and allow of the seat lying within the bulk of the folded standards and legs, substantially as set forth.

Fourth, In folding arm-chairs the several parts of which are united by and movable upon fixed joints, we claim making the rigid seat when hinged to the front and supported by the rear rail as herein described, narrower in the rear than in front so as to clear the tops of the rear legs as set forth.

Fifth, In combination with the arrangement last referred to, we claim studs or projections in the rear of the seat for the purpose of suitably bracing the chair when open for use, as herein set forth.

Sixth, Combining with a non-flexible seat attached to the front and supported by the rear rails of a folding arm-chair, operating as described, a cam or its equivalent, for the purpose of raising the seat out of side contact with the rear legs whilst the chair is being folded.

Seventh, In folding arm-chairs operating as described, we claim the combination of a non-flexible seat hinged to the front rail and supported by the rear rail with a strap fastened to the front and rear of the seat and passing over the rear rail for the purpose of holding the seat within the bulk of the folded frame, substantially as set forth.

43,367.—Mechanism for filling or building Bobbins in Spinning.—Simeon Goodwin (assignor to Charles A. Shaw), Biddeford, Maine :

First, I claim a mechanism for building or filling the "Hussey bobbin," in the manner shown in Fig. 4, and as herein described, when constructed and used substantially as set forth and specified.

Second, I claim a mechanism for building or filling the "Emery bobbin," in the manner shown in Fig. 3, and as herein described and constructed and used substantially as herein specified.

Third, I claim the adjustable auxiliary piece for building or filling the "Goodwin bobbin," in the manner shown in Fig. 6, and herein described, when constructed and substantially as hereinbefore set forth.

43,368.—Clothes-wringer.—Josee Johnson (assignor to John Ward, Jr.,) Brooklyn, N. Y.:

First, I claim in clothes wringing machines, the intermediate upright, B, arranged between the uprights, A and C, substantially in the manner and for the purpose herein specified.

Second, I claim in combination with thr above the employment of the spring, I I, arranged at or near the middle hight in the machine, substantially as and for the purpose specified.

43,369.—Elevating Jack.—Samuel Lauchli (assignor to himself and Wm. G. Rich), St. Louis, Mo.:

I claim the combination of the double eccentric shaft, D, and independent alternating levers, E E, with the rack bar, C, substantially in the manner and for the purpose shown and described.

43,370.—Car Brake.—Bernard Morahan (assignor to Joseph L. Jernegan), New York City. Ante-dated June 23, 1864 :

I claim, first, The adjustable dog, F, or its equivalent, arranged in combination with a stud or projection, h, on the side of the wheel, B*, and with the brake, D D, substantially as herein specified so that by the direct action of the stud or projection on the dog the brakes are applied.

Second, The movable stop, j, and hinged spring latch, K, or their equivalents applied in combination with the dog, F, and stud or projection, h, in the manner and for the purpose substantially as herein set forth.

Third, The weighted lever, j*, and hinged cam, k, or their equivalents in combination with the rock shaft, G, arm, i, dog, F, and stud, h, all arranged and operating substantially as and for the purpose herein shown and described.

43,371.—Manufacture of Tin Cans.—George W. Prince, Cambridge, Mass., assignor to Banker & Carpenter, Boston, Mass.:

I claim uniting the top, bottom, and sides of a tin can by means of double or guttered flanges on one piece, and single flanges on the adjacent piece through the intervention of solder applied thereto when the lock or joint is turned and formed on the inside of the can, which gives strength to the can and protection to the lock or joint, substantially in the manner and for the purpose described.

43,372.—Drill.—George C. Taft, (assignor to Thomas H. Dodge), Worcester, Mass.:

I claim the movable slotted cam, H, within the recess of the lever, E, to impart to said lever an oscillating motion substantially as and for the purpose herein described.

I also claim in combination with the feed wheel, D, the friction wheel, L, and pawl, M, for the purpose of coupling and releasing the screw spindle, B, from the driving pulley, substantially as herein described.

I also claim, in combination with the adjustable slotted cam, H, within the recess of the lever, E, the adjustable pin supporter, h, as and for the purpose described.

I also claim the combination of the driving pulley, K, cam lever, E, slotted cam, H, friction wheel, L, pawl, H, feed wheel, D, and spindles, B C, when constructed and operated as herein described.

43,373.—Cartridge Box.—J. T. Warren, Stafford, N. Y., assignor to Robert A. Chesebrough, New York City:

I claim the construction, arrangement and combination of the

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metallic box, E, with its upper and lower apartments, G, and link, H, operating on the pivot, J, of the case; K, substantially as herein described.

43,374.—Portable Coffee Mill.—Sam.'H. Witmer, assignor to Mahlon M. Wambaugh, Cincinnati, Ohio :

I claim the portable telescopic coffee-mill, constructed substantially as described.

43,375.—Railroad Car Coupling.—Rich. D. Chatterton, Bath, Great Britain :

I claim the combination of the pawl, B B', coupling-head, d d', and bearing, D d, arranged and operating substantially as and for the purposes specified.

[This invention consists in the employment or use of a shackle in connection with a pawl or catch placed in the draw-head, and all so arranged that a self-connecting car-coupling is obtained, and one which will be applicable to the securing of draught-poles and thills to ordinary horse carriages.]

43,376.—Sugar-mold.—Carl Kronig, Vienna, Austria :

I claim the new article of manufacture herein described, being a sugar-mold formed of papier-mache, in the manner substantially as set forth.

43,377.—Water Defences as the Protecting Armor of Vessels.—Albert Pagenstecher, Valparaiso, Chili :

I claim, first, The employment or use of bags made of india-rubber or other suitable material, and filled with water, substantially as herein specified, for the purpose of forming armor for a vessel.

Second, The application to the sides of a vessel of sheets, B, of india-rubber, or other suitable flexible and elastic material, to operate in combination with metal strips, C, and adjusting bolts, E, substantially in the manner and for the purpose herein shown and described.

[This invention consists is the application to the outside of a vessel of a series of chambers with flexible sides, made of sheets of india-rubber, or other suitable elastic material, to be filled with water when in action, and emptied when not in action in such a manner that the armor can be drawn up tight to its sides, where it does not interfere with the sailing qualities of said vessel, and when preparing for action the armor can be expanded by filling the chambers with water, thus encasing the entire vessel in a water-jacket, and protecting it against projectiles of any kind that may be hurled against it.]

43,378.—Metal Cans, Cases, Boxes, etc., for preserving food, gunpowder, liquids, paints, oils, and other articles.—Jean Bouvet, La Rochelle, France, assignor to Moritz Primer, New York City :

I claim the manufacture and use of metal boxes, cans, cases, and other metallic vessels, hermetically sealed or closed by inserting and soldering a wire between the body and the intended opening of such metal box, can, case, and other metallic vessel, one end of such wire protruding at the outside for beginning and effecting such opening.

RE-ISSUES.

1,709.—Roller for expressing Water from Clothes.—Selden A. Bailey, Simeon S. Cook and Benedict M. Cook, Woonsocket, R. I., assignees by mesne assignments of John Allender, New London, Conn. Patented Jan. 11, 1859 :

We claim, first, A roller so constructed as to yield more at its center than at or near its ends, in combination with a covering of vulcanized rubber of tubular form, as and for the purpose set forth,

Second, Cog-wheels, in combination with elastic rollers, constructed and used substantially as set forth

1,710.—Machine for wringing Clothes.—Selden A. Bailey, Simeon S. Cook and Benedict M. Cook, Woonsocket, R. I., assignees by mesne assignments of said S. A. Bailey. Patented April 5, 1859 :

We claim, first, The employment of the cylindrical wooden spring-piece, a a, which is divided in two parts at its center, each part being being slotted from the place of division, as shown in the drawing, towards its outer end, the same being covered by rubber cylinder, substantially in the manner and for the purpose specified.

Second, The spring, F, in combination with elastic rollers, for the purpose set forth.

1,711.—Electro-magnetic Bathing Apparatus.—James Young, New York City. Patented May 14, 1861 :

I claim, first, The use of the above-described electrodes, i and i charged and operated in the manner and for the purposes herein before specified.

Second, The use of adjustable metallic plates or electrodes, i i', in combination with stationary metallic plates or electrodes, C and D, connected with an electro-magnet in combination with a non-conducting bath-tub, for the purpose specified.

Third, The combination of the bathing-tub, A, an electro-magnet, metallic strip, q q', and brakes, r r' r2 r3 r4 r5 and r6, for the purpose of charging at will each or all of the metallic plates or electrodes, in the tub, A, and operating substantially as described.

Fourth, The combination of a non-conducting bath-tub with a metallic plate or electrode at each end, one electrode being connected with a positive pole, and the other electrode with a negative pole of an electro-magnet.

Fifth, The use of the main switch, n' n, by which the polarity of all the brakes, r r' r2 r3 r4 r5 and r6 are at once reversed, and by one movement.

Sixth, The combination of an electro-magnet, M, bathing-tub, A, and metallic vessel, H, with a rod, m, operating as and for the purpose set forth.

Seventh, So combining a swing-tub, A, switch, N, and an electro-magnet, M, that by the oscillating motions of the tub the current is changed,

Eighth, So arranging the top-rail, a*, on the sides of the tub, that the same projects over the inside and outside, in the manner and for the purposes set forth.

Ninth, I claim the stationary metallic guides or side-rails, j j', attached to the sides or top-rail of a bath, when used for maintaining in position, guiding or charging with electricity the electrodes, i i', substantially as described.

1,712.—Elevating and delivering Water from Wheels.—James Daykin, Cleveland, Ohio. Patented August 21, 1860 :

I claim, first, The inclined board, K, or its substantial equivalent, as herein described, in combination with the spouts, A' and E', bucket, E, valve, M, rod, L, rope, S, or its described equivalent, and counter-balance weight, F, the whole being constructed, arranged and operated in the manner and for the purpose set forth.

Second, I claim throwing the lower end of the bucket forward over the delivery spout by means of the inclined board, K, whether said board is entire or only represented by its operative parts of contact, as herein described, and opening the valve, M, by the same movement, by means of the rod, L, in the manner herein fully set forth.

1,713.—Stave Machine.—Jonathan E. Warner, Boston, Mass. Patented Nov. 15, 1853 :

I claim clamps, which support the interior surface of a stave, and are combined with and turn on an axis which is at substantially the same distance from the position of the stave as the axis of the barrel of which the stave is to form a part, substantially as set forth, in combination with a revolving cutter for bevelling the end of a stave, and also in combination with a revolving cutter for howeling the end of a stave, and also in combination with a revolving crozing cutter, each acting on the stave substantially as described.

I also claim pairs of clamps mounted and turning on an axis having the relation to the barrel described, whereby one stave may be adjusted in readiness for working off on one pair of clamps, while another stave supported on another pair of clamps is being worked off by revolving cutters as specified.

I also claim the combination of dressing up cutters with unyielding exterior clamps for the stave to be dressed up, and with yielding internal clamps turning on an axis, substantially the same as that of the barrel to be formed by the stave, all being and operating substantially as set forth.

I also claim the combination of exterior and internal clamps for the stave, which latter turn on an axis located with reference to the stave, substantially as described, with revolving cutters for bevelling, howeling and crozing the two ends of the stave without removing it from between the clamps, all being and operating substantially as set forth.

I also claim the combination of exterior and interior clamps for the stave, the latter turning on axis located with reference to the stave, as described, with two sets of revolving cutters and two circular saws, all being and operating substantially as set forth, so that the stave may be worked off by applying it once to the machine.

I also claim cutter-heads and exterior clamps which are adjustable lengthwise of a stave, substantially as described, in combination with interior clamps also adjustable lengthwise of the stave, as set forth, whereby staves of different lengths may be worked off in the same machine, as specified.

I also claim the combination of the internal clamps for the stave with their axis in such manner that they may be adjusted radially, substantially as set forth.

1,714.—Machinery for the manufacture of Wool and other fibrous materials.—Eben D. Jordan, Boston, Mass., assignee by mesne assignments of John Goulding. Patented December 15, 1826. Reissued July 29, 1836. Extended Aug. 30, 1862, by Act of Congress :

First, I claim, in combination, the following sets of apparatus, or elements making up a machine namely : first, a bobbin-stand or creel; second, bobbins on which roving may be wound; third, guides or pins; fourth, a carding-machine; fifth, condensing and drawing-off apparatus; and, sixth, winding apparatus, all substantially such as are herein described, whereby rovings may be fed to a carding-machine, carded, condensed, drawn off and wound again in a condensed state, substantially in the manner herein-before set forth.

Second, I claim the feed-rollers of a carding-machine, in combination with bobbins and proper stands therefor, and guides or pins, whereby slivers or rovings may be fed to be carded by mechanism, substantially such as herein described.

Third, I claim a delivering-cylinder of a carding-machine, in combination with apparatus for drawing off, condensing or twisting, and winding carded filaments, the apparatus being substantially such as herein described, whereby carded filaments may be delivered, drawn off, condensed and wound in a condensed state upon bobbins, as herein-before set forth.

And, lastly, I claim a mule or spinning-frame, provided with spindles mounted on a carvage, and with jaws or their equivalents for retaining roving, in combination with bobbins whose axes are parallel or nearly so with the line of spindles, and rest upon drums revolving to unwind the bobbins, the combination being and operating substantially as herein-before set forth.

DESIGNS.

1,966.—Clock-case.—Robert Dunn, Greenpoint, N. Y.

1,967.—Group of Figures.—John Rogers, New York City.

PATENTS

GRANTED

FOR SEVENTEEN YEARS!

MUNN & COMPANY,

In connection with he publication of the SCIENTIFIC AMERICAN, have acted as Solicitors and Attorneys for procuring "Letters Patent" for *new inventions* in the United States and in all foreign countries during the past *seventeen years*. Statistics show that nearly ONE-THIRD of all the applications made for patents in the United States are solicited through this office; while nearly THREE-FOURTHS of all the patents taken in foreign countries are procured through the same source. It is almost needless to add that, after *seventeen years'* experience in preparing specifications and drawings for the United States Patent Office, the proprietors of the SCIENTIFIC AMERICAN are perfectly conversant with the preparation of applications in the best manner, and the transaction of all business before the Patent Office; but they take pleasure in presenting the annexed testimonials from the three ast ex-Commissioners of Patents :—

MESSRS. MUNN & CO.:—I take pleasure in stating that, while I held the office of Commissioner of Patents, MORE THAN ONE-FOURTH OF ALL THE BUSINESS OF THE OFFICE CAME THROUGH YOUR HANDS. I have no doubt that the public confidence thus indicated has been fully deserved, as I have always observed, in all your intercourse with the office, a marked degree of promptness, skill, and fidelity to the interests of your employers. Yours very truly,

CHAS. MASON.

Judge Mason was succeeded by that eminent patriot and statesman, Hon. Joseph Holt, whose administration of the Patent Office was so distinguished that, upon the death of Gov. Brown, he was appointed to the office of Postmaster-General of the United States. Soon after entering upon his new duties, in March, 1859, he addressed to us the following very gratifying letter:

MESSRS. MUNN & CO.:—It affords me much pleasure to bear testimony to the able and efficient manner in which you discharged your duties as Solicitors of Patents, while I had the honor of holding the office of Commissioner. Your business was very large, and you sustained (and I doubt not justly deserved) the reputation of energy, marked ability, and uncompromising fidelity in performing your professional engagements.

Very respectfully, your obedient servant,

J. HOLT.

Hon. Wm. D. Bishop, late Member of Congress from Connecticut, succeeded Mr. Holt as Commissioner of Patents. Upon resigning the office he wrote to us as follows:

MESSRS. MUNN & CO.:—It gives me much pleasure to say that, during the time of my holding the office of Commissioner of Patents, a very large proportion of the business of inventors before the Patent Office was transacted through your agency; and that I have ever found you faithful and devoted to the interests of your clients, as well as eminently qualified to perform the duties of Patent Attorneys with skill and accuracy. Very respectfully, your obedient servant,

WM. D. BISHOP.

THE EXAMINATION OF INVENTIONS.

Persons having conceived an idea which they think may be patentable, are advised to make a sketch or model of their invention, and submit it to us, with a full description, for advice. The points of novelty are carefully examined, and a written reply, corresponding with the facts, is promptly sent, free of charge. Address MUNN & CO., No. 37 Park Row, New York.

As an evidence of the confidence reposed in their Agency by inventors throughout the country, Messrs. MUNN & CO. would state that they have acted as agents for more than TWENTY THOUSAND inventors! In fact, the publishers of this paper have become identified with the whole brotherhood of inventors and patentees, at home and abroad. Thousands of inventors for whom they have taken out patents have addressed to them most flattering testimonials for the services rendered them; and the wealth which has inured to the individuals whose patents were secured through this office, and afterwards illustrated in the SCIENTIFIC AMERICAN, would amount to many millions of dollars! Messrs. MUNN & CO. would state that they never had a more efficient corps of Draughtsmen and Specification Writers than those employed at present in their extensive offices, and that they are prepared to attend to patent business of all kinds in the quickest time and on the most liberal terms.

PRELIMINARY EXAMINATIONS AT THE PATENT OFFICE.

The service which Messrs. MUNN & CO. render gratuitously upon examining an invention does not extend to a search at the Patent Office, to see if a like invention has been presented there; but is an opinion based upon what knowledge they may acquire of a similar invention from the records in their Home Office. But for a fee of $5, accompanied with a model, or drawing and description, they have a special search made at the United States Patent Office, and a report setting forth the prospects of obtaining a patent, &c., made up and mailed to the inventor, with a pamphlet, giving instructions for further proceedings. These preliminary examinations are made through the Branch Office of Messrs. MUNN & CO., corner of F. and Seventh streets, Washington, by experienced and competent persons. Many thousands of such examinations have been made through this office, and it is a very wise course for every inventor to pursue. Address MUNN & CO., No. 37 Park Row, New York.

HOW TO MAKE AN APPLICATION FOR A PATENT.

Every applicant for a patent must furnish a model of his invention if susceptible of one; or, if the invention is a chemical production, he must furnish samples of the ingredients of which his composition consists, for the Patent Office. These should be securely packed, the inventor's name marked on them, and sent, with the Government fees, by express. The express charge should be pre-paid. Small models from a distance can often be sent cheaper by mail. The safest way to remit money is by a draft on New York, payable to the order of Messrs. MUNN & CO. Persons who live in remote parts of the country can usually purchase drafts from their merchants on their New York correspondents; but, if not convenient to do so, there is but little risk in sending bank bills by mail, having the letter registered by the postmaster. Address MUNN & CO., No. 37 Park Row New York.

Patents are now granted for SEVENTEEN years, and the Government fee required on filing an application for a patent is $15. Other changes in the fees are also made as follows :—

On filing each Caveat	$10
On filing each application for a Patent, except for a design	$15
On issuing each original Patent	$20
On appeal to Commissioner of Patents	$20
On application for Re-issue	$30
On application for extension of Patent	$50
On granting the Extension	$50
On filing a Disclaimer	$10
On filing application for Design (three and a half years)	$10
On filing application for Design (seven years)	$15
On filing application for Design (fourteen years)	$30

The Patent Laws, enacted by Congress on the 2d of March, 1861, are now in full force, and prove to be of great benefit to all parties who are concerned in new inventions.

The law abolishes discrimination in fees required of foreigners, excepting natives of such countries as discriminate against citizens of the United States—thus allowing Austrian, French, Belgian, English, Russian, Spanish and all other foreigners, except the Canadians, to enjoy all the privileges of our patent system (except in cases of designs) on the above terms. Foreigners cannot secure their inventions by filing a caveat; to citizens only is this privilege accorded.

CAVEATS.

Persons desiring to file a caveat can have the papers prepared in the shortest time by sending a sketch and description of the invention. The Government fee for a caveat is $10. A pamphlet of advice regarding applications for patents and caveats is furnished gratis, on application by mail. Address MUNN & CO., No. 37 Park Row New York.

REJECTED APPLICATIONS.

Messrs. MUNN & CO. are prepared to undertake the investigation and prosecution of rejected cases, on reasonable terms. The close proximity of their Washington Agency to the Patent Office affords them rare opportunities for the examination and comparison of references, models, drawings, documents, &c. Their success in the prosecution of rejected cases has been very great. The principal portion of their charge is generally left dependent upon the final result.

All persons having rejected cases which they desire to have prosecuted, are invited to correspond with MUNN & CO., on the subject, giving a brief history of the case, inclosing the official letters, &c.

FOREIGN PATENTS.

Messrs. MUNN & CO., are very extensively engaged in the preparation and securing of patents in the various European countries. For the transaction of this business they have offices at Nos. 66 Chancery lane, London; 29 Boulevard St. Martin, Paris; and 26 Rue des Eperonniers, Brussels. They think they can safely say that THREE-FOURTHS of all the European Patents secured to American citizens are procured through their agency.

Inventors will do well to bear in mind that the English law does not limit the issue of patents to inventors. Any one can take out a patent there.

Circulars of information concerning the proper course to be pursued in obtaining patents in foreign countries through MUNN & CO'S Agency, the requirements of different Government Patent Offices, &c, may be had, gratis, upon application at the principal office, No. 37 Park Row, New York, or any of the branch offices.

SEARCHES OF THE RECORDS.

Having access to all the official records at Washington, pertaining to the sale and transfer of patents, MESSRS. MUNN & CO., are at all times ready to make examinations as to titles, ownership, or assignments of patents. Fees moderate.

INVITATION TO INVENTORS.

Inventors who come to New York should not fail to pay a visit to the extensive offices of MUNN & CO. They will find a large collection of models (several hundred) of various inventions, which will afford them much interest. The whole establishment is one of great interest to inventors, and is undoubtedly the most spacious and best arranged in the world.

MUNN & CO. wish it to be distinctly understood that they do not speculate or traffic in patents, under any circumstances; but that they devote their whole time and energies to the interests of their clients.

ASSIGNMENTS OF PATENTS.

The assignment of patents, and agreements between patentees and manufacturers, carefully prepared and placed upon the records at the Patent Office. Address MUNN & CO., at the Scientific American atent Agency, No. 37 Park Row, New York.

It would require many columns to detail all the ways in which the Inventor or Patentee may be served at our offices. We cordially invite all who have anything to do with patent property or inventions to call at our extensive offices, No. 37 Park Row, New York, where any questions regarding the rights of Patentees, will be cheerfully answered.

Communications and remittances by mail, and models by express (prepaid) should be addressed to MUNN & CO. No. 37 Park Row New York

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Notes and Queries

J. A., Jr., of Ill.—As a general rule we have very little faith in the published modes of destroying insects. Any fertilizer which induces a vigorous growth in the plant aids in enabling it to overcome the effects of insect bites, and in this way sulphate of ammonia might be useful, but it would be too costly for Illinois, where you do not cart your barn-yard manure to your fields.

D. E., of N. Y.—We know of no plan for making friction matches commercially for market without phosphorus. Thorough ventilation is the best preventive yet discovered for the terrible disease which is induced by exposure to the fumes of phosphorus.

P. D., of Pa.—You will find the comparative value of petroleum and coal for fuel fully discussed in another column, The right to a patent can be assigned before the patent is obtained We prepare such assignments; the cost is $3.

G. W. H., of N. Y.—Rock-oil naphtha is not adapted for making varnish, as it is a very poor solvent for gums. Coal-tar naphtha is an excellent solvent for some gums, though not for gum shellac. This would answer your purpose if you could obtain it. It has been sold somewhat below the present price of alcohol.

J. M., of Iowa.—When strata of rocks or clay slope down from hills or mountains, the water sometimes gets between the layers, which hold it from rising up in the valleys. If the strata above the seam of water are bored through, the water is forced up through the hole by the pressure of that in the upper portion of the seam. Artesian wells can be made therefore only in the vicinity of higher ground. Address Prof. Henry at the Smithsonian Institution in relation to their publications.

P. E., of N. Y.—The resistance spoken of in a falling body is that of inertia, which is in proportion to the weight. This is the principal resistance in dense bodies. The resistance of the air would be greater, as you say, in small spheres than in large ones in proportion to the weight, and would cause them to fall with less velocity.

F. G. W., of Mass.—The Giffard's injector is manufactured by Wm. Sellers & Son, of Philadelphia, and if you will write to them they will doubtless give you all the information that you want.

D. K., of R. I.—We have received your communication on "the drill and its office," but we have already published so many articles on that subject that we must decline your favor. Your ideas are good. Write again on some other subject and we shall try to give you a hearing.

A. V. S., of N. Y.—The Rubber Company to which you refer control the right to make, use, and sell and vend to others the same rights, the particular article protected by their patents; whenever the article passes into the market and is sold, the Company will have realized their legal tariff upon it, and any subsequent purchaser has a right to use it freely. The Company can collect but one tariff, and this they did at the first sale of the article.

S. C. & Co., of Ohio.—The travel of piston in feet of a steam engine is twice the stroke multiplied by the revolutions; or the length of stroke multiplied by the number of single strokes. Your 18-inch cylinder with a steam pipe only 3 inches diameter, is defective. The pipe should be five inches at least, and well covered to guard against radiation. It is more probable that the valve motion of your engine is defective, and if you will send us a diagram of it and the work the engine has to do, we can probably remedy the trouble.

E. W. S., of R. I.—You could not obtain a situation as an assistant engineer unless you had some knowledge of the business.

I. B. B., of N. Y.—A balloon rises in the air because the gas in the balloon is lighter than the air around it; the attraction of the earth draws the heavier air down under the balloon and thus pushes it up. The buoyancy of a balloon consequently depends upon the specific gravity of the gas with which it is filled. The lightest gas is hydrogen; it is 14½ times lighter than air. About 13 cubic feet of air weigh one pound and about 188 feet of hydrogen. In round numbers 14 cubic feet of hydrogen will raise one pound in the air, and it will take 7,000 cubic feet to raise 500 pounds. As the density of the air diminishes rapidly with the altitude, the size of the balloon must be increased for any considerable ascent. A horse-power is that which will raise 33,000 pounds one foot per minute; a half-horse power would therefore raise 82½ pounds 200 feet per minute. It is possible that a steam engine might be made weighing less than 200 pounds, which could be worked up to a half-horse power.

G. J., of N. Y.—Your criticism of our views in regard to some English notions may appear to you to be just. Upon this point we will not enter into controversy. Your style of refuting our ideas is, to say the least, somewhat below the standard of genuine politeness. When, however, you seek to correct our orthography, we have only to say that you are certainly not well informed. In our frequent use of words we are quite as likely to spell them correctly, as one whose business does not necessarily teach him either good manners or good spelling. If you will take the trouble to turn to Webster's Dictionary, which is the standard here, you will find that tun, traveler, center, theater, etc., are spelled correctly by us.

S., of Pa.—The Commissioner does not return the first installment of the patent fee in case the application is rejected. When the patent is allowed, $20 additional must be paid within six months, before the Letters can issue.

J. C. T., of Minn.—We are not aware that Paine's engine has been introduced, but you can ascertain by addressing Mr Archibald, at the British Consul's office, in this city.

Money Received.

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Improved Flour-packing Machine.

The engraving published herewith represents a machine for packing flour recently invented by Albert Brown, of Mifflinsville, Pa. It consists of a frame, A, which supports the packing machinery, and a hopper, B, which has a shaft, C, passing through it; at the lower end of this shaft there are two screw-shaped blades or packers. These are set one over the other, and the object of employing two is, that one shall spread the flour, or distribute it evenly to the lower one, so that the flour shall be evenly compressed in the barrel. The upper end of the shaft has a jaw upon it which connects with a lever, D; and the gear E, has a sleeve, through which the shaft freely slides. Inside the hopper and below the frame there is a pair of grooved rollers which embrace the shaft between them, so that while they lessen the friction of the parts working together they also keep the shaft true

BROWN'S MACHINE FOR PACKING FLOUR.

in its relation to the barrel or bag to be filled. The barrel to be packed sets on the platform, F, which is raised or lowered by the lever, G; and there is an adjustable funnel, H, at the bottom of the hopper, B, over which the mouth of a bag may be fitted closely. The gate, I, closes the mouth or bottom of the hopper, so that the flour above cannot escape when the full bag or barrel is removed; and it also regulates the descent of the flour to the packers as they require it. In the model from which the engraving is taken a crank is shown on the driving shaft, but in the working machine a pulley is to be applied. The shaft which carries the packers is weighted to give the necessary pressure to enable them to perform properly, and the shaft and packers attached rise as spring-rel is filled. The shaft is then sustained in its place by a spring catch on the handle, I, which enables the operator to put another barrel in position and proceed as before.

This flour-packer was patented on the 29th of April, 1862, by Albert Brown, of Mifflinsville, Pa. For further information address him at that place.

Flax and Flax-cotton.

The *Linum usitatissimum* of botany, from which the English *lint* and *linen* are derived, is now, by the peculiar circumstances of the production and consumption of textiles, and the comparative success of mechanical invention in the direction of flax manufacture, brought very prominently to public view. Many fibrous plants are used for cordage, clothing, and other purposes; among them hemp, jute, various tropical plants, &c. The New Zealand flax, or *Phormium tenax*, is much stronger than *Linum*, and very valuable for canvas and cordage, but the latter has almost a monopoly of manufactures of its class, and is common in all civilized countries and to all ages, from the Jewish era of "purple and fine linen" to the present day.

The Commissioner of Agriculture has received, recently, from different parts of the country, specimens of fibrous plants, indigenous, and seemingly worthy of experiment. The fiber of one of them, a member of the *Asclepia* family, is very long, fine, abundant, and exceedingly strong.

It is not improbable that new textiles may yet be added to the present list, and found more productive, more easily worked, or better adapted to particular uses than any others now known. The specimen of *Asclepia* in question has been submitted to experiments, similar to those by which flax is cottonized, and the result is a beautiful article, stronger than cotton or flax-cotton, fine and lustrous, and apparently susceptible of working upon cotton machinery. It is cottonized at less expense than flax.

A Mathematical Description of a Boiler Explosion.

The *Journal of the Franklin Institute* publishes a communication from John W. Nystrom, giving a history of the boiler explosion at Cornelius & Baker's works, from which we take this extract:—

"I shall first explain it as if I had been on the spot and seen it with my own eyes, and then give the data upon which my argument is based. The mud-drum in the northern boiler was the first that gave way and caused the explosion. It burst near the middle, about 4 inches from the center line; the numerous fragments of the mud-drum bruised and cut several holes in the shell of the tubular boiler above it, and also one hole in the south boiler. The before-calculated collective force in the boilers, is now suddenly relieved; its momentum finds the weakest part, first in the tubular boiler next to the bursted mud-drum, to be in the connections where nearly half of the strength of the shell is cut away. It blew wide open the whole length, acted uniformly on the steam-drum above, threw the latter up with a velocity of 254 feet per second, or 173 miles per hour, into the air, at an angle of 47° 30′ south, by 7° 16′ east, struck the cornice of the main building 60 feet 4 inches above, and 58 feet 2 inches horizontally from its home. When it struck, it was at an angle of about 20° to the building, with the gage-cock or man-hole end foremost. This obstruction caused it to deviate from its original course about 11° 16′, or south, by 4° west; continued to a hight of 272 feet, the vortex of the parabola. In the flight it made $1\frac{3}{10}$ turns in the length, and arrived with a velocity of 237 feet per second, from an altitude of 51° 30′, in the Penn stable, Market street, just 1,000 feet from home. The drum seemed to have been horizontal with north and south, when it struck the roof of the stable, falling with the south end on a strong beam in the floor, broke through with the north end into the cellar, where it injured slightly one man, and killed a horse, rested in a position of about 55°. The time of flight was about 5·75 seconds."

THE design for the Gettysburg monument, awarded to Mr. James G. Batterson, of Hartford, Conn., is as follows:—A solid white marble base with four buttresses, each supporting a statue representing respectively, "History," "War," "Peace" and "Plenty." From the center rises a shaft of marble, crowned with a colossal bronze statue of the "Goddess of Liberty," fifteen feet high. The hight of the monument will be fifty feet, and the cost will be fifty thousand dollars.

THE

Scientific American,

FOR 1864!

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